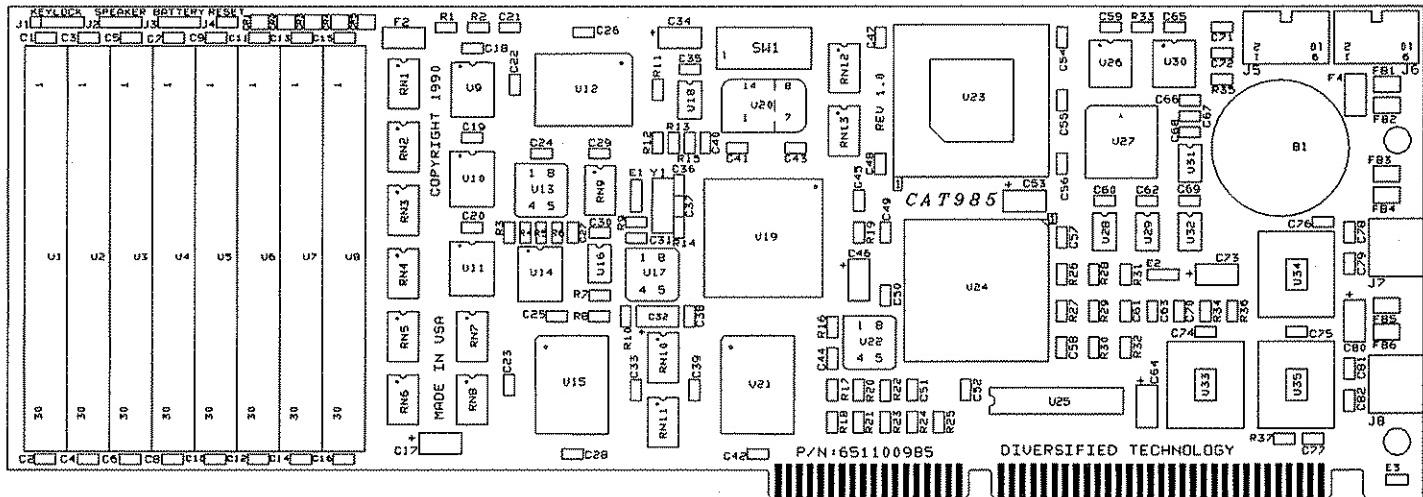


**DIVERSIFIED TECHNOLOGY
INCORPORATED**

CAT985
REV. 1.2

**AT COMPATIBLE
Configuration Guide**



PREFACE

This configuration guide provides general characteristics and specifications, information for configuration, installation and operation, and service information.

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HOW TO USE THIS MANUAL

This manual is a product of Diversified Technology, Inc. and is designed to help you, the end user, configure your system with the least amount of effort and be up and running in the shortest time possible. A great deal of effort has been put in to achieve this end, and if you have any comments that would help us improve this manual please let us know so that we can better serve you, our customer.

This manual is organized for ease of use but you may find some sections redundant. We have included sections for each level of user from expert to novice, and in the process of doing this some redundancy is created. The sections of the manual, with a brief outline of content, are listed below:

SECTION 1: This is a general overview of the CAT985. While little hard technical information is included, it should provide you with a concept of the features of the CAT985.

SECTION 2: This section contains a step-by-step description of how to set the physical jumpers and switches on the board and what they really mean. This chapter will be of most use to a first-time user of the board, and to users that need detailed information. Those who have configured a CAT985 board before may find Section 4.0 faster to use.

SECTION 3: Section 3 contains a description of the ports and connectors on the CAT985. This information is mostly for the more technical user who needs to know the pinout of the ports.

SECTION 4: This is a highly condensed reference which describes the connectors, switches and jumpers with a minimum of verbage.

SECTION 5: Section 5 is a complete description of the built-in SETUP utilities. This chapter should be consulted to make sure that the board is set up properly.

SECTION 6: These "maps" identify the system resources required by the CAT985 and many common expansion cards. It may be useful in configuring your system.

SECTION 7: This section is a troubleshooting guide, intended to help with those rare problems you might experience with the CAT985.

SECTION 8: This section describes how to return your CAT985 for service.

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SECTION 1 CAT985 PRODUCT OVERVIEW

1.0 General Overview

The CAT985 is a low-power 80386-based single board PC/AT integrated computer system which operates at 25 MHz, with 0K, 64K, 128K, 256K, or 512K USER PROM DISK, and provides PS/2 compatible mouse and keyboard support.

The CAT985 is based on a highly flexible chip set which provides the ability to vary both internal and /AT bus timing under program control. The chip set additionally provides support for page-interleave memory accesses and BIOS shadowing. Onboard ROM utilities allow easy system configuration.

Accepting eight SIMM memory modules, the CAT985 provides onboard memory capacities of up to 32 megabytes. An onboard lithium battery with a projected life of five years maintains setup data. Connections are provided for external reset, speaker, keylock and an optional external battery. The keyboard, mouse, and speaker are provided with short-circuit protection.

The following sections will provide an overview of the various features of the CAT985.

1.1 Keyboard and Mouse Ports

Keyboards and mouse devices designed for the PS/2 may be connected directly to the CAT985; the connectors for these devices are accessible through the bracket. Alternate connectors are also available on the CAT985 board edge. Standard /AT keyboards may be connected to the alternate connectors by means of an adapter cable. This cable is available from DTI or may be easily fabricated.

1.2 Onboard Memory

Up to 32 megabytes of 32 bit wide DRAM may be installed on the CAT985. The CAT985 accepts popular 256K, 1 Meg, and 4 Meg by 9 SIMM modules. Operation at 25 MHz requires 80 nsec SIMMs for near zero wait state operation.

1.3 User PROM

The CAT985 provides up to 512K bytes of user PROM at locations U33 and U35. The CAT985 accepts 64K x 8, 128K x 8, and 256K x 8 PROM devices in 32-pin PLCC packages. Either or both user PROM sockets can be populated and are independent of each other. However, when using the user PROM as a disk emulator, PROM 0 must be installed as the first PROM. If both PROMs are used and are not the same device type, then the larger device must be installed as PROM 0.

1.4 Numeric Coprocessor

The CAT985 accepts an optional 80387 or Weitek 3167 coprocessor. The coprocessor must operate at 25MHz to match the CPU speed. The coprocessor is automatically detected.

1.5 Reset, Keyboard Lock, Speaker Ports, Battery

The CAT985 supports connections to a reset switch, a keyboard lock, a speaker and an optional external battery.

The onboard lithium thionyl chloride battery provides offline backup of time-of-day and configuration information for up to 5 years. The onboard battery can be disabled if desired, and an external power source connected. The CAT985 can accommodate external batteries in the voltage range of 3.0 - 6.5 volts.

External reset switches are connected to a two pin switch closure input. It is debounced and pulled up internally.

A keyboard lock and power indication LED may be connected to the 5 pin keyboard lock connector. The LED current supply is 5 volts through a 330 ohm resistor.

A speaker may be connected to the "standard" speaker connector. This port is protected against short circuits of the speaker 5 volts to ground.

1.6 /AT Bus

Asynchronous bus speeds of 6 or 8 MHz are provided. The actual speed is set through jumper E1. The default bus speed is 8 MHz. At both speeds, the bus emulation of the CAT985 duplicates the bus cycles of the /AT bus. No "speed switching" is used. Local memory and I/O accesses do not appear on the bus, preventing false responses from adapter cards. The minimum wait states inserted for I/O and memory cycles may be set in the ROM configuration utility. It is possible to increase the wait states to assure compatibility with older or poorly designed cards.

SECTION 2 CAT985 CONFIGURATION INFORMATION

Very little hardware configuration is required with the CAT985. Configuration requirements are outlined below, by function.

2.1 Keyboard Type Selection and Mouse Connection

XT, AT, or PS/2 type keyboards may be used with the CAT985. Multi-functional keyboards that select between XT and AT modes with a switch, usually on the underside of the keyboard, will function properly with the CAT985.

PS/2 mouse devices use Interrupt 12. This interrupt must be connected if such a device is used. When a PS/2 mouse is connected, switch SW1-5 must be set as shown in Figure 1.

2.2 AT Bus Speed

The AT bus can run at 6 or 8MHz. The actual speed is chosen by the 3 pin jumper E1. Strapping across pins 1 and 2 selects a 6MHz bus, whereas, strapping across pins 2 and 3 selects an 8MHz bus. Jumper E1 is shown in Figure 1.

2.3 Memory Configuration

DRAM SIMM modules of 256K, 1M, and 4M by 9 bits are supported. Two banks of 4 SIMMs can be installed on the CAT985. SIMMs should be installed four at a time and in the order shown in Figure 2.

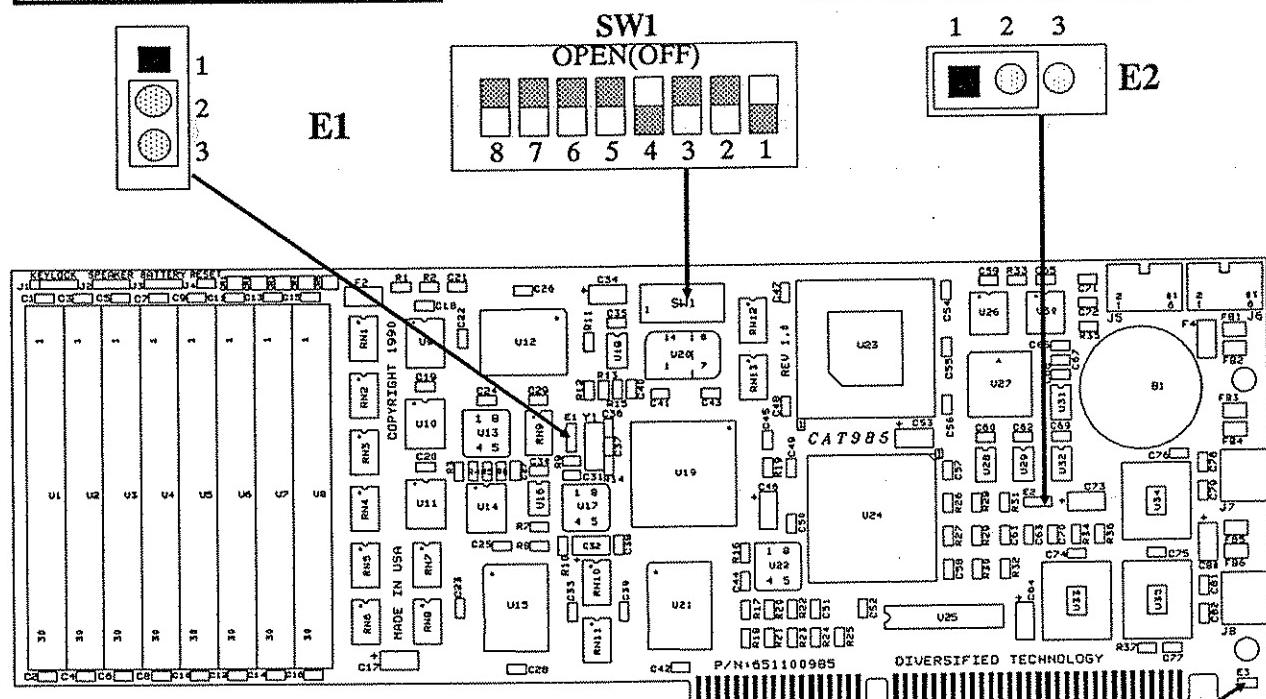
All SIMM modules in a bank (a block of 4 SIMMs) must be the same size; however, mixing SIMM sizes between banks is allowed. In some cases, mixing SIMM capacities can result in a slight decrease in performance due to the inability to page-interleave with different capacity DRAMs.

For near zero wait state operation, 80 nsec DRAM is required. Wait states can be inserted to support operation with 100 nsec DRAM, but performance will be degraded.

Figure 1: Switch and Jumper Settings

SWITCH	IF CLOSED(ON)	IF OPEN(OFF)
SW1-1	*USER PROM DISABLE	USER PROM ENABLE
SW1-2	BIOS SIZE = 128K	*BIOS SIZE = 64K
SW1-3	PROM ADDRESS = E000:0h	*PROM ADDRESS = D000:0h
SW1-4	*ADDRESS PIPELINING	NO PIPELINING
SW1-5	USE IRQ12 FOR MOUSE	*NORMAL
SW1-6	MANUFACTURING TEST	*NORMAL
SW1-7	COLOR MONITOR	*MONO MONITOR
SW1-8	/XT KEYBOARD	*/AT, PS/2 KEYBOARD

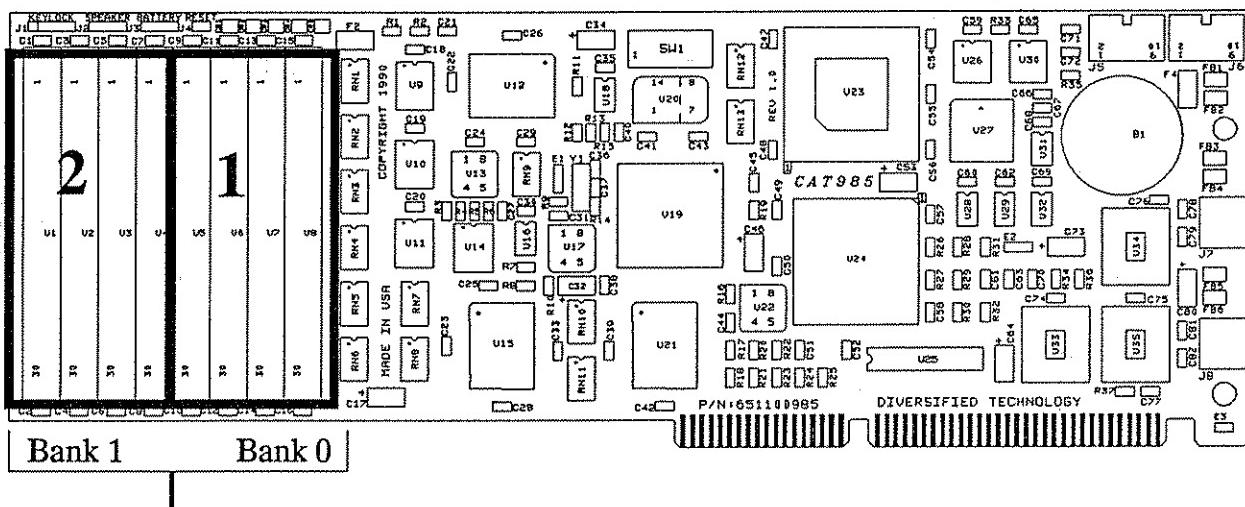
E1-AT BUS SPEED	E2-Position	Mode
1-2	*1-2	EPROM
*2-3		FLASH Read Operation
	2-3	FLASH Write Operation



E3-CAT985 BRACKET	
*ON	GROUNDED
OFF	NOT GROUNDED

* - Denotes Factory Setting

Figure 2 : Memory configuration



Add DRAM SIMMS in this order, in groups of four.

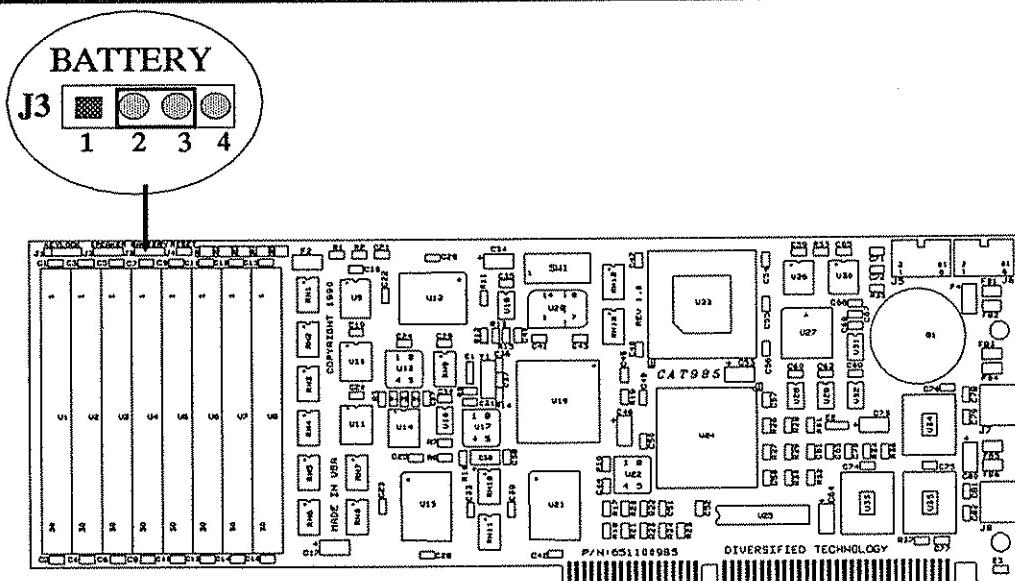
2.4 Battery Backup

Onboard battery backup for the real time clock and setup information is provided on the CAT985. In the event that this is not desirable, such as long term storage or to reset bad setup information, the battery may be disconnected by removing the jumper normally connected to J3. An external battery may be used for backup in place of the onboard lithium battery. The CAT985 can accept external batteries in the range of 3.0 - 6.5 volts. The connection to J3 depends on the voltage of the battery to be used. See Section 3 for details.

The battery supplied with the CAT985 has a projected life of 5 years in normal service. Elevated temperatures or mishandling of the board can shorten the life of the battery. Placing the CAT985 on conductive surfaces can dramatically shorten battery life. While the CAT985's battery was chosen for safety as well as energy density, some simple safety precautions should be followed:

- **Do not expose the CAT985 to temperatures over 100° C**
- **Do not attempt to recharge the onboard lithium battery**
- **Do not puncture the onboard lithium battery**

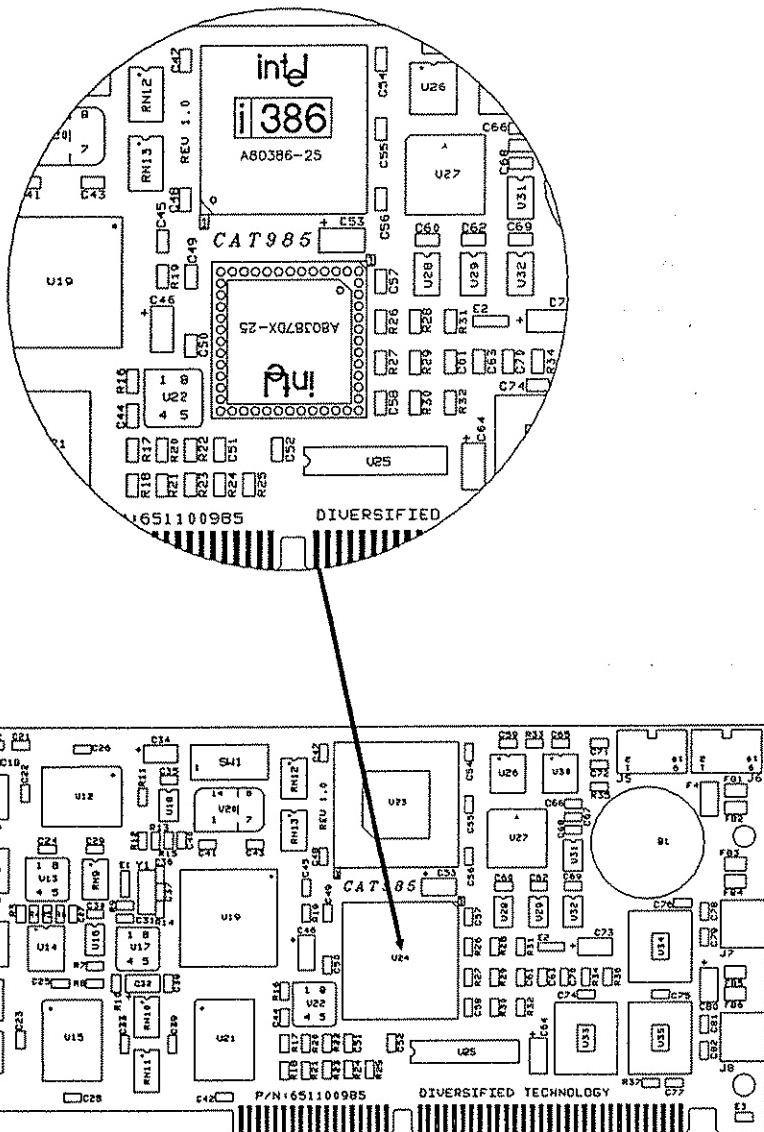
J3 - BATTERY PORT	
J3 CONNECTION	CONFIGURATION
NONE	NO BACKUP
*PLACE JUMPER BETWEEN PINS 2 AND 3	ONBOARD BATTERY
+3.5 - 4.5V ON PIN 2, GND ON PIN 4	EXTERNAL 3.5 - 4.5 VOLT BATTERY
+4.5 - 6.5 V ON PIN 1, GND ON PIN 4	EXTERNAL 4.5 - 6.5 VOLT BATTERY



2.5 Coprocessor Installation

The CAT985 accepts an optional Weitek 3167 or 80387 math coprocessor. If installed, the coprocessor speed must match the speed of the processor, i.e., a 25 MHz CAT985 requires a 25 MHz 80387. The presence of the coprocessor is sensed automatically.

WARNING: It is all too easy to install an 80387 incorrectly. The 80387 could be destroyed if incorrectly installed and power is applied. Examine the following diagram carefully!



2.6 User PROM

Up to 512Kbytes of USER PROM is provided on the CAT985. PROM 0 is located at U33, and PROM 1 is located at U35. Both locations support 64K x 8, 128K x 8 or 256K x 8 PROM devices in 32-pin PLCC packages. When enabled (SW1-1 "OFF"), the PROM is bank switched into a 64K byte memory space at E000:0h or D000:0h. The PROM address is selected via switch SW1-3. If the system BIOS size is 128K (SW1-2 "ON"), then the PROM address must be D000:0h.. Refer to Figure 1 for definitions of these switches.

The CAT985 provides the option of using either EPROM or FLASH memory for the PROM disk. EPROMs require erasing and programming machines to perform write operations, while FLASH memory may be written to onboard. Jumper E2 position 1-2 must be strapped when EPROM is installed OR if a FLASH Memory is installed and write protected. E2 position 2-3 should be strapped when FLASH Memory is installed and a WRITE operation is to be performed.

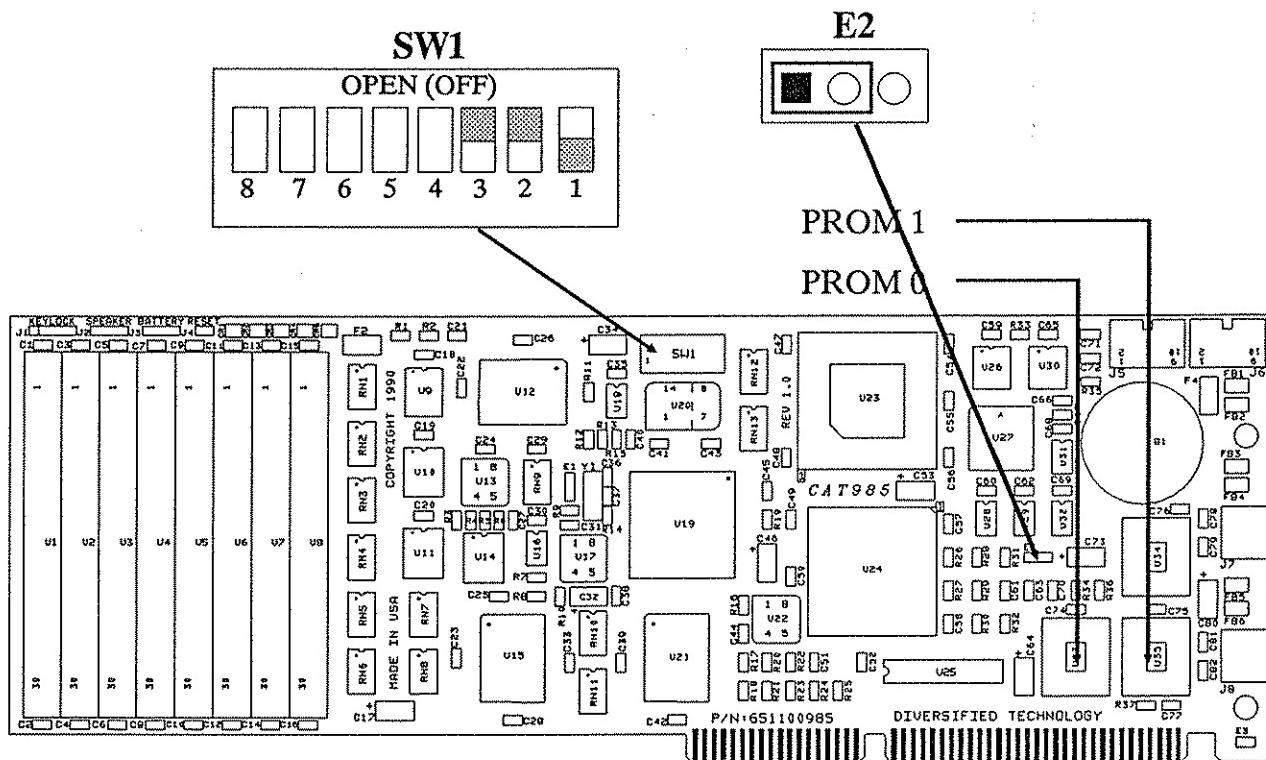
The USER PROM is further configured via the "PROM DISK CONFIGURATION" utility within the ROM Utilities. The user is given the option of configuring the PROM as a disk emulator, or as a bank switched PROM.

If disk emulator is selected, the user must select whether or not the PROM DISK should be bootable, define the type of diskette to emulate, and specify the type of PROM(s) to be used. Make sure that the diskette emulation type selected is the same as the type of diskette used during the creation of the PROM DISK image files. PROM 0 must be installed first and must be of equal or larger size than PROM 1 (if installed). Read Appendix A "PROM DISK GENERATION" on how to create the PROM DISK image files, and Appendix B "FLASH MEMORY" on how to program flash memory devices.

To configure as bank switched PROM, set the PROM MODE to USER ROM. In this configuration the PROMs are independent of each other unless otherwise defined by the user. The PROMs are accessed through the lower three bits of I/O location 030H. The lower three bits of the byte written to the I/O address are defined as follows. Bits 0 & 1 are used to select a bank within the PROM. Each PROM device is broken down into 64K byte sections called banks, each of which is sequentially accessible. Therefore, with a 256K PROM there are 4 banks that are accessible by writing 0 through 3 to the I/O address. Bit 2 of the byte written out to the I/O address is used to select between PROMs. Bit 2 set to 0 will select PROM 0 and bit 2 set to 1 will select PROM 1.

E2 Position	Mode
*1-2	EPROM
	FLASH Read Operation
2-3	FLASH Write Operation

Switch	If Closed (ON)	If Open (OFF)
SW1-1	*User PROM Disable	User PROM Enable
SW1-2	BIOS Size = 128K	*BIOS Size = 64K
SW1-3	PROM Address = E000:0h	*PROM Address = D000:0h

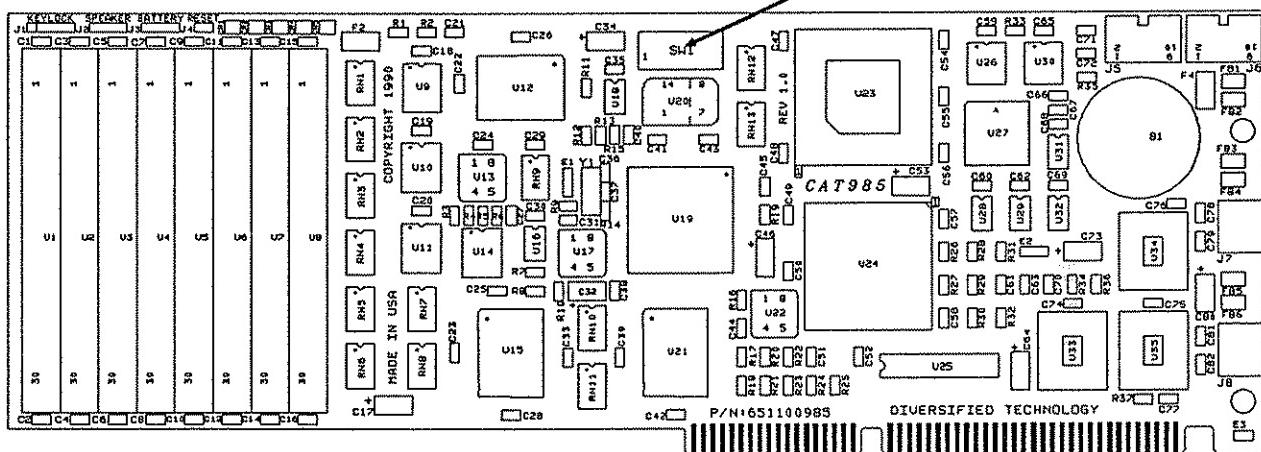
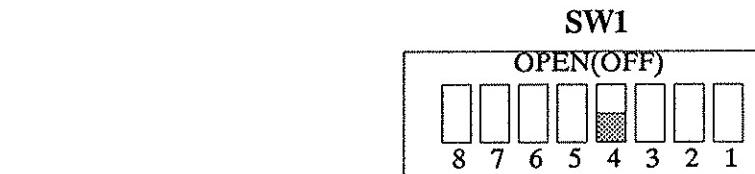


2.7 Address Pipelining

The address pipelining option is provided through switch SW1-4, shown in the table below. The fastest bus cycle using pipelined address requires only 2 bus states. Therefore, cycles with pipelined address timing allow the same data bandwidth as non-pipelined cycles, but address-to-data access time is increased compared to that of non-pipelined cycle.

By increasing the address-to-data access time, pipelined address timing reduces wait state requirements. For example, if one wait state is required with non-pipelined address timing, no wait states would be required with pipelined address timing.

SWITCH SW1-4	
ON	*PIPELINING MODE
OFF	NON-PIPELINING MODE



SECTION 3 CAT985 CONNECTORS

In the following chapter, the CAT985's connectors are described. A description and pin-out is provided for each connector.

3.0 Keylock Port

Pin 4 of the key lock port may be grounded through a switch to lock the keyboard. By connecting a switch between pins 3 and 4 of the connector, the keyboard may be inhibited as a protection feature. The keylock port connector is a 5 pin 0.1" spacing connector. Also included in the keylock port is an output for driving a power indication LED. This LED connection delivers 5 volts through a 330 ohm dropping resistor. The pin out for the keylock port is as follows:

J1 - KEYLOCK PORT	
PIN	SIGNAL
1	POWER LED
2	N/C
3	GND
4	KEYLOCK
5	GND

3.1 Speaker Port

A speaker may be connected to the CAT985 through the speaker port connection J2. J2 is a 4 pin 0.1" spacing connector. The pinout for J2 is given in the table below. Speakers are typically connected between the speaker data pin 1 and ground on pin 3. Some speakers may emit slightly more volume when connected between speaker data and 5 volts (pin 4). The 5 volt supply for the speaker is protected against short circuits. If an overload condition is sensed, the speaker 5 volt supply will be disconnected until the overload is removed for approximately 30 seconds.

J2 - SPEAKER PORT	
PIN	SIGNAL
1	SPEAKER DATA
2	N/C
3	GND
4	5 VOLTS

3.2 Battery Port

The CAT985 has an onboard lithium thionyl chloride battery with a projected lifetime of five years. An option is provided for use of an external battery if desired. The battery port, J3, may be configured to support no battery, onboard battery, or external battery backup. The external battery connection is split into two voltage ranges (3.5-4.5V, 4.5-6.5V) in order to minimize the current usage. Connection of a higher battery voltage than the input's rating will result in excessive current draw from the battery. Conversely, if a battery with a voltage lower than the input rating is connected, erratic backup may result.

J3 - BATTERY PORT	
J3 CONNECTION	CONFIGURATION
REMOVE JUMPER	NO BACKUP
JUMPER BETWEEN PINS 2 AND 3	ONBOARD BATTERY BACKUP
+3.5 - 4.5 VOLTS ON PIN 2, GND ON PIN 4	EXTERNAL 3.5 - 4.5 VOLT BATTERY
+4.5 - 6.5 VOLTS ON PIN 1, GND ON PIN 4	EXTERNAL 4.5 - 6.5 VOLT BATTERY

3.3 Reset Port

The CAT985 provides a hardware reset input at J4. This input is designed for a switch closure input, and is debounced and buffered.

J4 - RESET PORT	
PIN	SIGNAL
1	RESET
2	GND

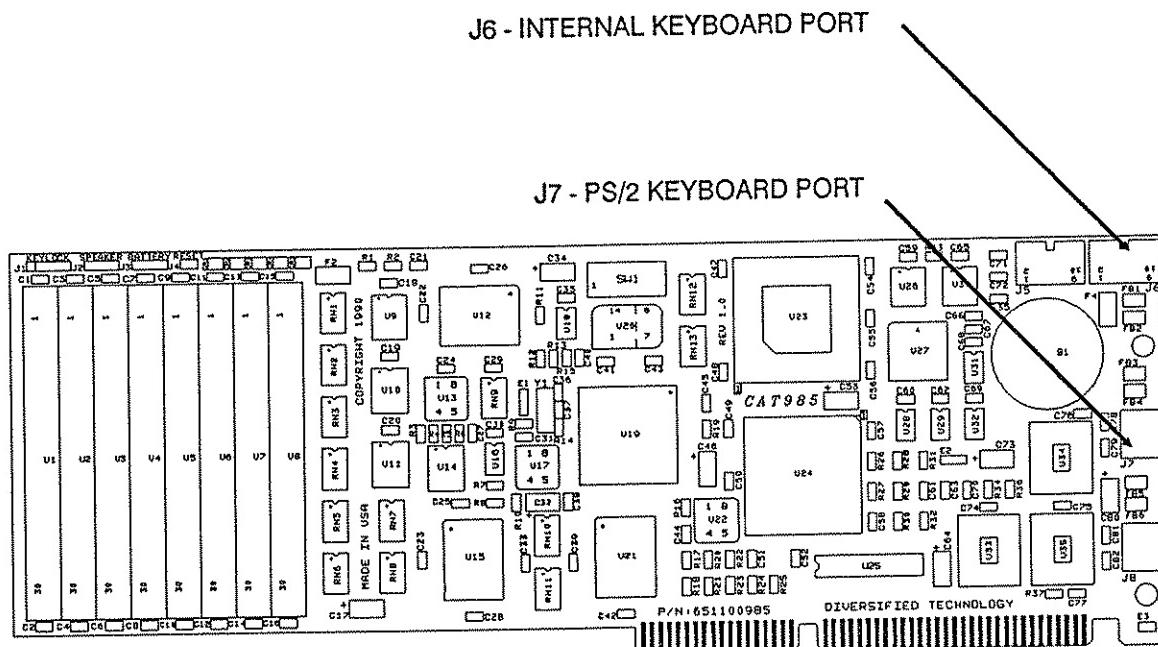
3.4 Keyboard Port

The CAT985 supports most common keyboards. PS/2 style keyboards are supported directly by connection to J7 on the bracket. /AT and /XT keyboards may be connected by means of adapter cables to J6 on the top edge of the board. These adapter cables may be easily constructed by use of the table below, or suitable cables may be obtained from Diversified Technology.

J6 - INTERNAL KEYBOARD PORT			
SIGNAL	PIN	PIN	SIGNAL
+5 VOLTS	1	2	DATA
CLOCK	3	4	N/C
GND	5	6	N/C
N/C	7	8	N/C
N/C	9	10	+5 VOLTS

J7 - PS/2 KEYBOARD PORT	
PIN	SIGNAL
1	DATA
2	N/C
3	GND
4	+5 VOLTS
5	CLOCK
6	GND

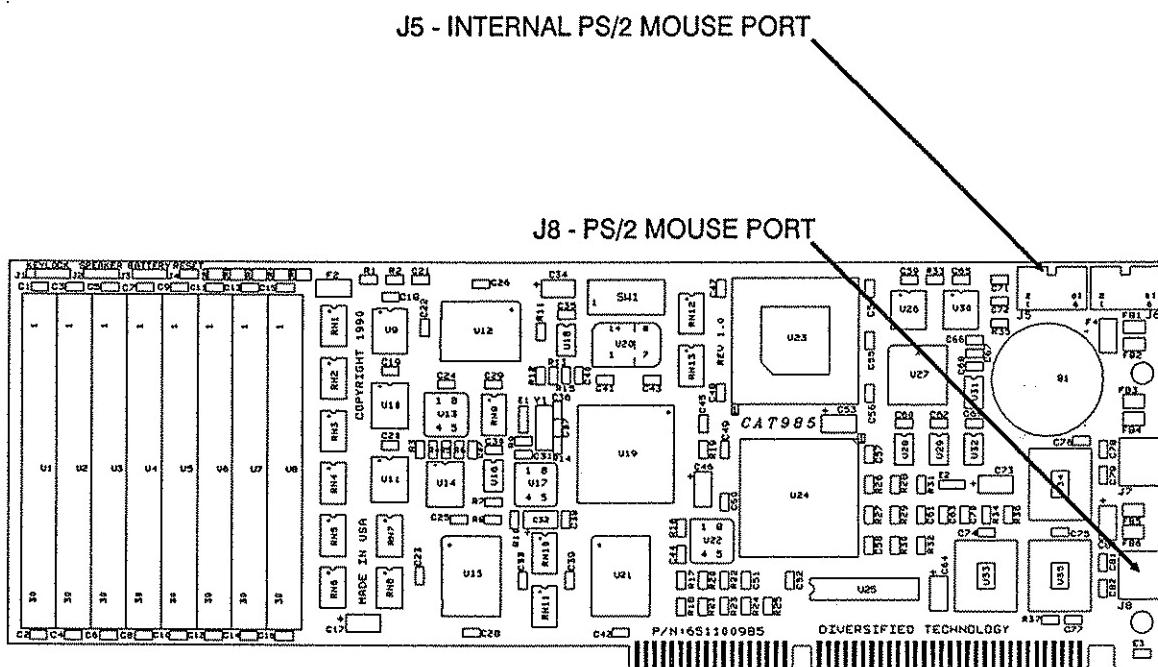
The 5 volt supply for the keyboard is protected from short circuits by a current limiting device. This device limits the total current available to the keyboard and mouse to approximately 1.2 A. If more current than this is drawn, the current limiting device will reduce the current output of the keyboard and mouse port to a few millamps. In order to reset the current limiting device, remove the short circuit and power down the system for approximately 30 seconds.



3.5 Mouse Port

Hardware is provided to attach PS/2 style mouse devices to the CAT985. A PS/2 mouse may be connected directly to the CAT985 by connection to J8 on the bracket. Internally, J5 is provided for attaching a PS/2 mouse by means of adapter cables. The PS/2 mouse port is enabled/disabled in the CAT985 ROM Utilities. The table below gives the pinout for the mouse ports:

J5 - INTERNAL PS/2 MOUSE PORT				J8 - PS/2 MOUSE PORT	
SIGNAL	PIN	PIN	SIGNAL	PIN	SIGNAL
+5 VOLTS	1	2	DATA	1	DATA
CLOCK	3	4	N/C	2	N/C
GND	5	6	N/C	3	GND
N/C	7	8	N/C	4	+5 VOLTS
N/C	9	10	+5 VOLTS	5	CLOCK



SECTION 4 CAT985 QUICK REFERENCE

This chapter is intended to be a quick reference for those users that are in a hurry or who are already familiar with the CAT985. The information contained in this chapter is a pictorial rehash of the tables and figures in the previous two chapters. If further information is required, please refer to the relevant areas of Sections 2 and 3.

Peripheral Connector Pinouts:

J1 - KEYLOCK PORT	
PIN	SIGNAL
1	POWER LED
2	N/C
3	GND
4	KEYLOCK
5	GND

J2 - SPEAKER PORT	
PIN	SIGNAL
1	SPEAKER DATA
2	N/C
3	GND
4	5 VOLTS

J3 - BATTERY PORT	
J3 CONNECTION	CONFIGURATION
Remove jumper	NO BACKUP
Place jumper between pins 2 and 3	ONBOARD BATTERY BACKUP
+3.5 - 4.5 on pin 2, GND on pin 4	EXTERNAL 3.5 - 4.5 VOLT BATTERY
+4.5 - 6.5 on pin 1, GND on pin 4	EXTERNAL 4.5 - 6.5 VOLT BATTERY

J4 - RESET PORT	
PIN	SIGNAL
1	RESET
2	GND

Mouse/Keyboard Connector Pinouts:

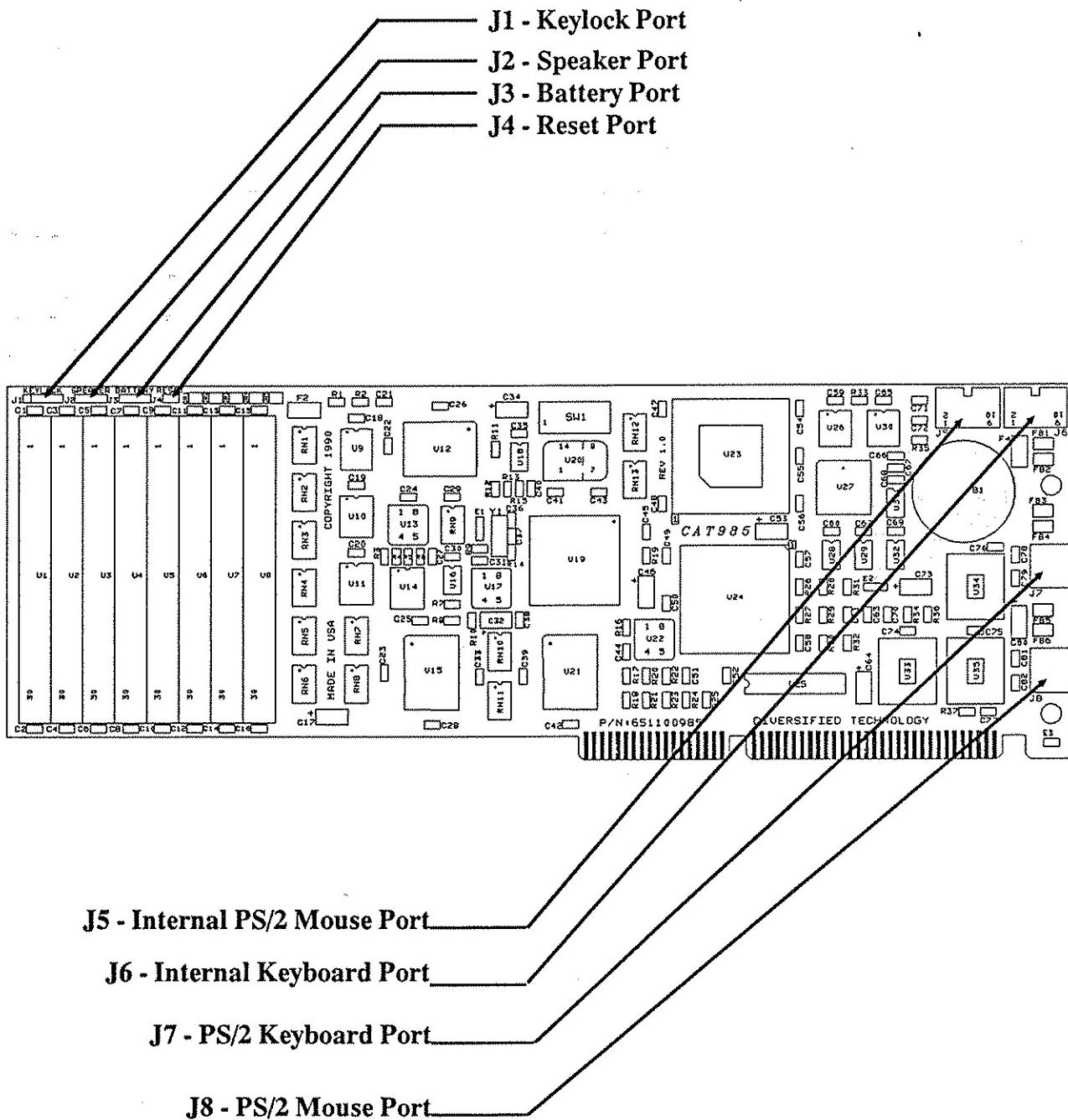
J6 - INTERNAL KEYBOARD PORT			
SIGNAL	PIN	PIN	SIGNAL
+5 VOLTS	1	2	DATA
CLOCK	3	4	N/C
GND	5	6	N/C
N/C	7	8	N/C
N/C	9	10	+5 VOLTS

J7 - PS/2 KEYBOARD PORT	
PIN	SIGNAL
1	DATA
2	N/C
3	GND
4	+5 VOLTS
5	CLOCK
6	GND

J5 - INTERNAL PS/2 MOUSE PORT			
SIGNAL	PIN	PIN	SIGNAL
+5 VOLTS	1	2	DATA
CLOCK	3	4	N/C
GND	5	6	N/C
N/C	7	8	N/C
N/C	9	10	+5 VOLTS

J8 - PS/2 MOUSE PORT	
PIN	SIGNAL
1	DATA
2	N/C
3	GND
4	+5 VOLTS
5	CLOCK
6	GND

CAT985 CONNECTORS

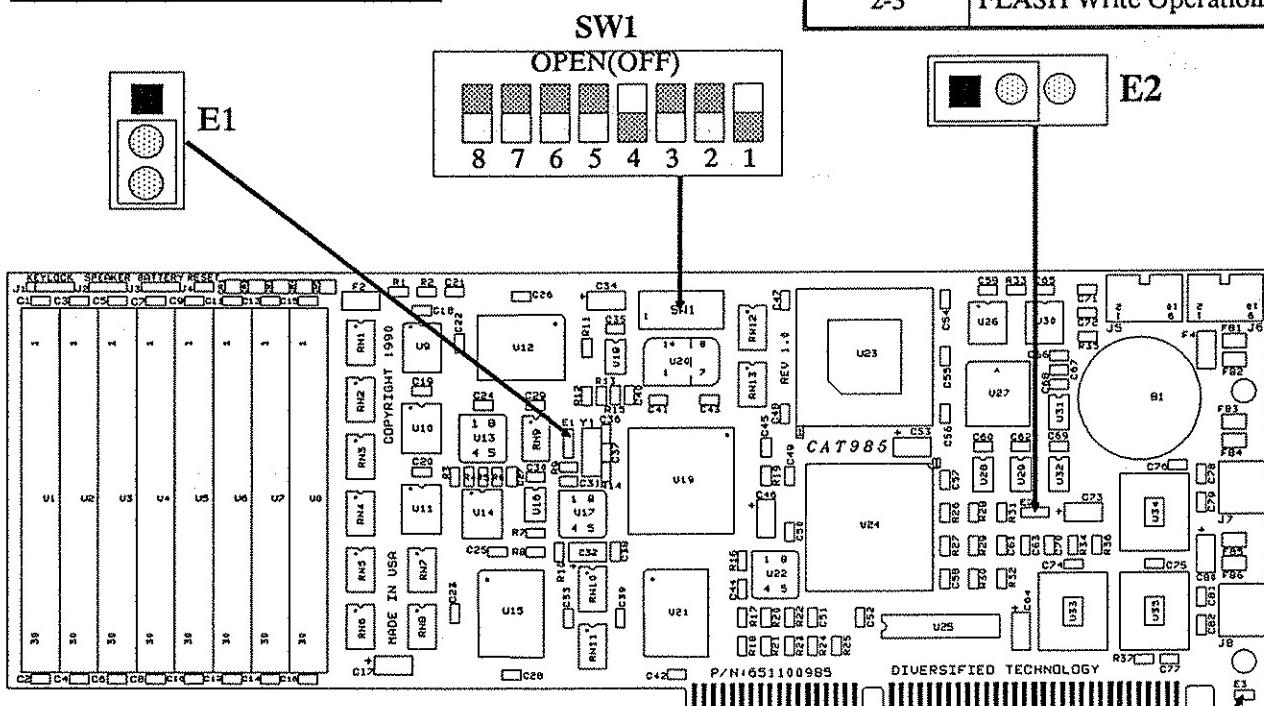


Switch and Jumper Settings

SWITCH	IF CLOSED(ON)	IF OPEN(OFF)
SW1-1	*USER PROM DISABLE	USER PROM ENABLE
SW1-2	BIOS SIZE = 128K	*BIOS SIZE = 64K
SW1-3	PROM ADDRESS = E000:0h	*PROM ADDRESS = D000:0h
SW1-4	*ADDRESS PIPELINING	NO PIPELINING
SW1-5	USE IRQ12 FOR MOUSE	*NORMAL
SW1-6	MANUFACTURING TEST	*NORMAL
SW1-7	COLOR MONITOR	*MONO MONITOR
SW1-8	/XT KEYBOARD	*/AT, PS/2 KEYBOARD

E1 -AT BUS SPEED	
1-2	6MHz
*2-3	8MHz

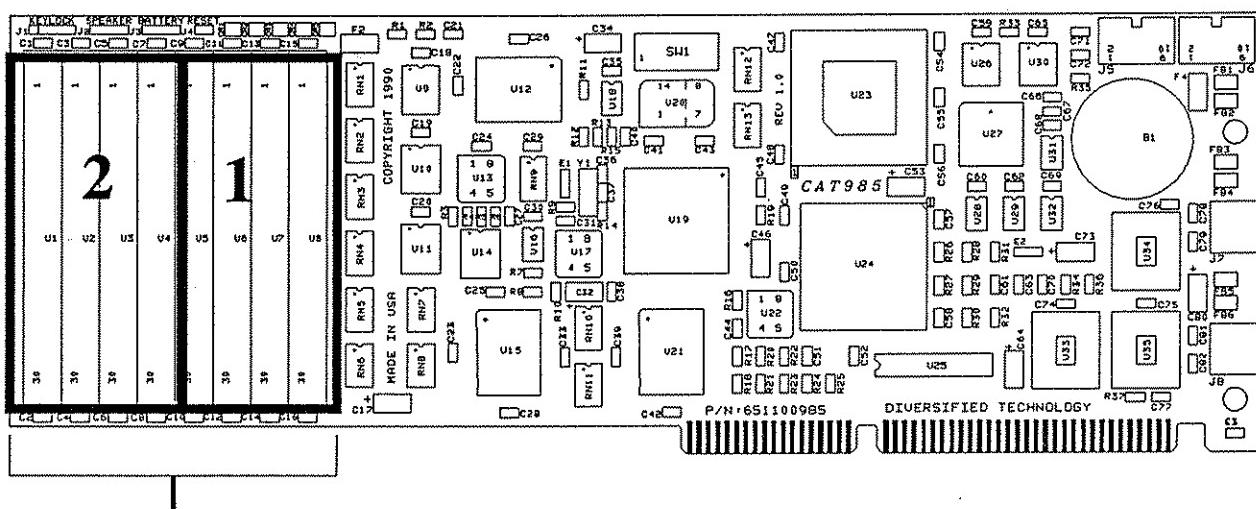
E2 Position	Mode
*1-2	EPROM
	FLASH Read Operation
2-3	FLASH Write Operation



E3-CAT985 BRACKET	
*ON	GROUNDED
OFF	NOT GROUNDED

* - Denotes Factory Setting

Memory Configuration



Add DRAM SIMMS in this order, in groups of four.

SECTION 5 CAT985 ROM UTILITIES

The following pages illustrate the screens and options available in the CAT985 ROM utilities.

CAT985 ROM UTILITIES
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F1 - AT CMOS SETUP UTILITY

F2 - CAT985 CONFIGURATION

F3 - PROM DISK CONFIGURATION

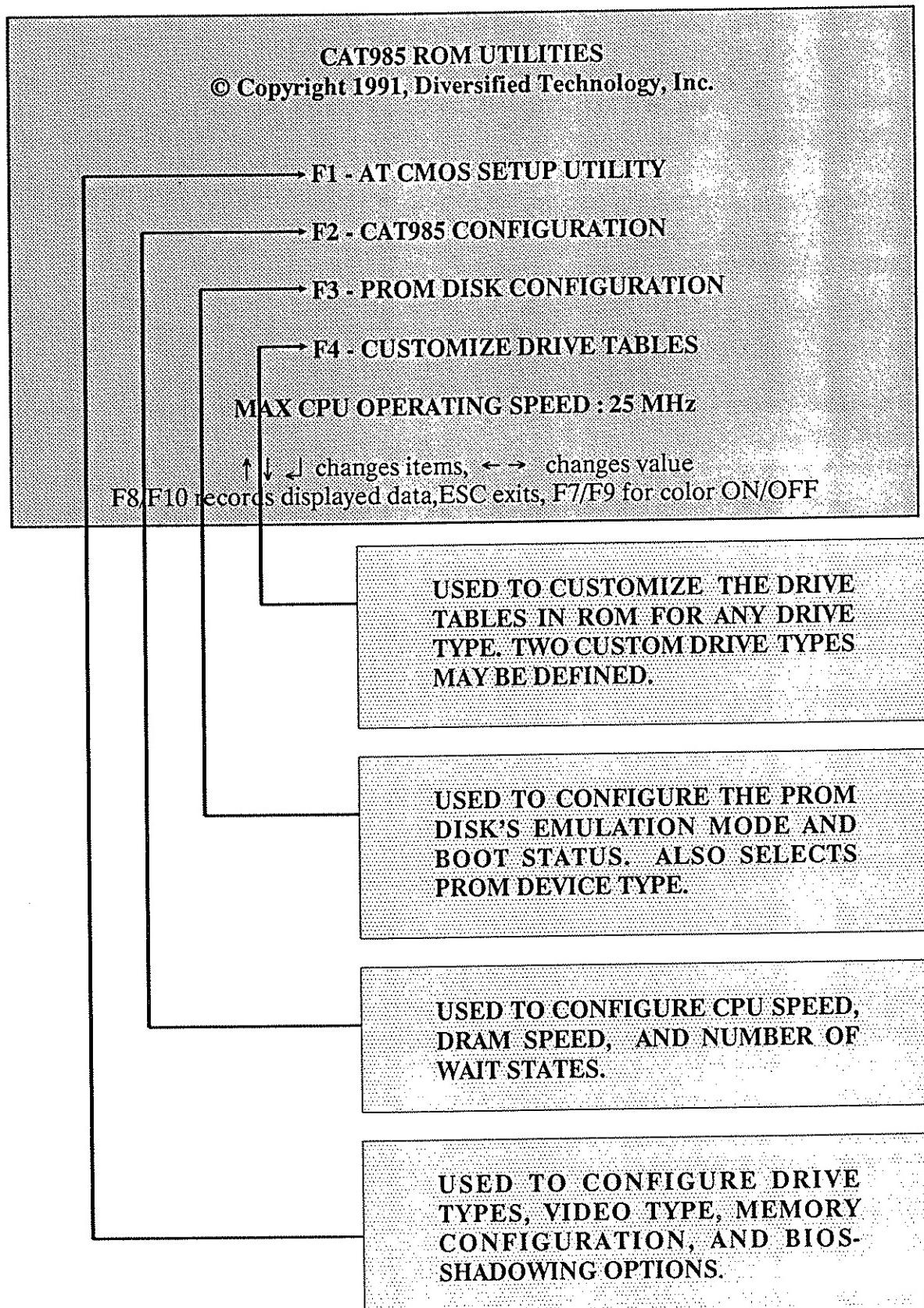
F4 - CUSTOMIZE DRIVE TABLES

MAX CPU OPERATING SPEED : 25MHz

↑ ↓ ← changes items, ← → changes value
F8/F10 records displayed data, ESC exits, F7/F9 for color ON/OFF

THIS IS THE MAIN MENU FOR THE
CAT985 ROM UTILITIES. YOU CAN
GET TO THIS SCREEN AT ANY TIME
BY PRESSING THE FOLLOWING SE-
QUENCE ON YOUR KEYBOARD:

CTRL - ALT - ESC



CMOS SETUP UTILITY**AT CMOS SETUP PROGRAM**

© Copyright 1991, Diversified Technology, Inc.

DATE: 2/4/91

TIME 13:5:29

DISKETTE 1: 1.2M
DISKETTE 2: NONE

CYLINDERS HEADS SECTORS PRECOMP SIZE

FIXED DISK 1: 11 855 5 17 NONE 37
FIXED DISK 2: NONE**VIDEO:** EGA/VGA**BASE MEMORY:** 640**EXTENDED MEMORY:** 0**MEMORY TEST:** EXECUTE**HALT CONDITIONS:** HALT ON ALL ERRORS**SHADOW VIDEO BIOS:** ENABLED**PS/2 MOUSE PORT:** DISABLED

↑ ↓ ← → changes items, ← → changes value
F8/F10 records displayed data, ESC exits, F7/F9 for color ON/OFF

THE ABOVE SCREEN IS DTI's SETUP SCREEN. THE FOLLOWING PAGES WILL TAKE YOU THROUGH EACH OF THE LINES, LISTING THE AVAILABLE OPTIONS.

AT CMOS SETUP PROGRAM							
© Copyright 1991, Diversified Technology, Inc.							
DATE: 2/4/91			TIME 13:5:29				
DISKETTE 1:	1.2M	DISKETTE 2:	NONE				
CYLINDERS HEADS SECTORS PRECOMP SIZE							
FIXED DISK 1:	11	855	5	17	NONE	37	
FIXED DISK 2	NONE						
VIDEO:	EGA/VGA						
BASE MEMORY	640						
EXTENDED MEMORY	0						
MEMORY TEST	EXECUTE						
HALT CONDITIONS	HALT ON ALL ERRORS						
SHADOW VIDEO BIOS	ENABLED						
PS/2 MOUSE PORT	DISABLED						
 ↑ ↓ ← → changes items, ← → changes value F8/F10 records displayed data, ESC exits, F7/F9 for color ON/OFF							

THE CIRCLED AREAS ARE USED TO CONFIGURE THE DATE AND TIME. USE THE ARROW KEYS TO POSITION THE HIGHLIGHTED BAR OVER THE DATE/TIME AND TYPE IN THE CORRECT VALUES. PRESS RETURN TO ENTER THE NEW DATE/TIME.

AT CMOS SETUP PROGRAM					
© Copyright 1991, Diversified Technology, Inc.					
DATE: 2/4/91			TIME 13:5:29		
DISKETTE 1:	1.2M	DISKETTE 2:	NONE		
CYLINDERS HEADS SECTORS PRECOMP SIZE					
FIXED DISK 1:	11	855	5	17	NONE 37
FIXED DISK 2	NONE				
VIDEO:	EGA/VGA				
BASE MEMORY	640				
EXTENDED MEMORY	0				
MEMORY TEST	EXECUTE				
HALT CONDITIONS	HALT ON ALL ERRORS				
SHADOW VIDEO BIOS	ENABLED				
PS/2 MOUSE PORT	DISABLED				
 ↑ ↓ ↘ changes items, ← → changes value F8/F10 records displayed data, ESC exits, F7/F9 for color ON/OFF					

THE CIRCLED AREA IS USED TO CONFIGURE THE DRIVE TYPES FOR THE FIXED DISKS IN THE SYSTEM. THE PARAMETERS FOR EACH DRIVE TYPE ARE LISTED WHEN THAT DRIVE TYPE IS SELECTED. DRIVE TYPES 48 AND 49 ARE DEFINED BY THE CUSTOM DRIVE TYPE UTILITY. SELECT THE DRIVE TYPE USING THE LEFT AND RIGHT ARROW KEYS AND PRESS ENTER TO RECORD THE SELECTED PARAMETERS.

AT CMOS SETUP PROGRAM

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DATE: 2/4/91

TIME 13:5:29

DISKETTE 1: 1.2M
DISKETTE 2: NONE

	CYLINDERS	HEADS	SECTORS	PRECOMP	SIZE
FIXED DISK 1:	11	855	5	17	NONE 37
FIXED DISK 2:	NONE				
VIDEO:	EGA/VGA				
BASE MEMORY	640				
EXTENDED MEMORY	0				
MEMORY TEST	EXECUTE				
HALT CONDITIONS	HALT ON ALL ERRORS				
SHADOW VIDEO BIOS	ENABLED				
PS/2 MOUSE PORT	DISABLED				

↑ ↓ ← → changes items, ← → changes value

F8/F10 records displayed data, ESC exits, F7/F9 for color ON/OFF

THE CIRCLED AREA IS USED TO CONFIGURE THE VIDEO TYPE FOR THE SYSTEM. THE SETUP UTILITY DETERMINES THE VIDEO TYPE AUTOMATICALLY. IF THE DISPLAYED VIDEO TYPE IS INCORRECT, USE THE LEFT AND RIGHT ARROW KEYS TO SELECT THE TYPE OF DISPLAY CARD IN THE SYSTEM AND PRESS ENTER TO RECORD THE SELECTED TYPE.

AT CMOS SETUP PROGRAM

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DATE: 2/4/91

TIME 13:5:29

DISKETTE 1: 1.2M
DISKETTE 2: NONE

	CYLINDERS	HEADS	SECTORS	PRECOMP	SIZE
FIXED DISK 1:	11	855	5	17	NONE 37
FIXED DISK 2	NONE				
VIDEO:	EGA/VGA				
BASE MEMORY	640	0			
EXTENDED MEMORY					
MEMORY TEST	EXECUTE				
HALT CONDITIONS	HALT ON ALL ERRORS				
SHADOW VIDEO BIOS	ENABLED				
PS/2 MOUSE PORT	DISABLED				

↑ ↓ ← → changes items, ← → changes value

F8/F10 records displayed data, ESC exits, F7/F9 for color ON/OFF

THE CIRCLED AREA IS USED TO SPECIFY THE AMOUNT OF MEMORY INSTALLED IN THE CAT985. THIS AREA SHOULD ALWAYS DISPLAY THE SIZE OF THE MEMORY FOUND BY THE POWER-ON-SELF-TEST(POST). TO ENTER A DIFFERENT MEMORY SIZE, POSITION THE HIGHLIGHTED BAR OVER THE VALUE TO BE CHANGED AND TYPE IN THE NEW VALUE. PRESS ENTER TO RECORD THE NEW VALUE. IF THE SIZE DOES NOT MATCH THE AMOUNT OF MEMORY INSTALLED IN THE SYSTEM, THE USER WILL BE PROMPTED TO PRESS F5 TO VERIFY THAT THE NEW VALUE SHOULD BE ENTERED.

AT CMOS SETUP PROGRAM

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DATE: 2/4/91

TIME 13:5:29

DISKETTE 1: 1.2M
DISKETTE 2: NONE

CYLINDERS HEADS SECTORS PRECOMP SIZE

FIXED DISK 1: 11 855 5 17 NONE 37
FIXED DISK 2: NONE

VIDEO: EGA/VGA

BASE MEMORY 640

EXTENDED MEMORY 0

MEMORY TEST EXECUTE

HALT CONDITIONS HALT ON ALL ERRORS

SHADOW VIDEO BIOS ENABLED

PS/2 MOUSE PORT DISABLED

↑ ↓ ← → changes items, ← → changes value

F8/F10 records displayed data, ESC exits, F7/F9 for color ON/OFF

THE CIRCLED AREA IS USED TO DETERMINE WHETHER OR NOT THE MEMORY WILL BE TESTED BY THE BIOS ON POWER-UP. IF BYPASS IS SELECTED, THE MEMORY WILL BE SIZED AND CLEARED, BUT WILL NOT BE TESTED. IT IS RECOMMENDED THAT THE MEMORY TEST BE EXECUTED, EXCEPT DURING PERIODS OF TESTING OR DEBUGGING WHEN THE SYSTEM MAY BE RESET FREQUENTLY. USE THE LEFT OR RIGHT ARROW KEYS TO SELECT THE DESIRED OPTION.

AT CMOS SETUP PROGRAM
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DATE: 2/4/91

TIME 13:5:29

DISKETTE 1: 1.2M
DISKETTE 2: NONE

	CYLINDERS	HEADS	SECTORS	PRECOMP	SIZE
FIXED DISK 1:	11	855	5	17	NONE 37
FIXED DISK 2	NONE				
VIDEO:	EGA/VGA				
BASE MEMORY	640				
EXTENDED MEMORY	0				
MEMORY TEST	EXECUTE				
HALT CONDITIONS	HALT ON ALL ERRORS				
SHADOW VIDEO BIOS	ENABLED				
PS/2 MOUSE PORT	DISABLED				

↑ ↓ ← → changes items, ← → changes value
F8/F10 records displayed data, ESC exits, F7/F9 for color ON/OFF

THE CIRCLED AREA IS USED TO DETERMINE WHAT TYPE OF ERRORS SHOULD BE REPORTED DURING THE POST. ERRORS ARE TYPICALLY INDICATED BY ERROR MESSAGES ON THE SCREEN DURING THE POST, FOLLOWED BY A PROMPT FOR THE USER TO PRESS F1 TO ACKNOWLEDGE THE ERROR AND CONTINUE TO BOOT, OR F2 TO ENTER THE ROM UTILITIES. THE PROMPT CAN BE ELIMINATED BY SELECTING ONE OF THE NO HALT OPTIONS HERE. NO HALT ON ANY ERROR INSTRUCTS THE BIOS TO CONTINUE TO BOOT REGARDLESS OF THE ERRORS THAT OCCUR, PROVIDED THEY ARE NON-CRITICAL. USE THE LEFT OR RIGHT ARROW KEYS TO SELECT THE DESIRED OPTION.

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DATE: 2/4/91

TIME 13:5:29

DISKETTE 1: 1.2M
DISKETTE 2: NONE

	CYLINDERS	HEADS	SECTORS	PRECOMP	SIZE
FIXED DISK 1:	11	855	5	17	NONE 37
FIXED DISK 2	NONE				
VIDEO:	EGA/VGA				
BASE MEMORY	640				
EXTENDED MEMORY	0				
MEMORY TEST	EXECUTE				
HALT CONDITIONS	HALT ON ALL ERRORS				
SHADOW VIDEO BIOS	ENABLED				
PS/2 MOUSE PORT	DISABLED				

↑ ↓ ← changes items, ← → changes value
F8/F10 records displayed data, ESC exits, F7/F9 for color ON/OFF

THE CIRCLED AREA IS USED TO ENABLE/DISABLE VIDEO BIOS SHADOWING. SHADOWING REFERS TO COPYING THE VIDEO BIOS ROM INTO FASTER 32-BIT DRAM ONBOARD. THIS IMPROVES PERFORMANCE OF VIDEO INTENSIVE APPLICATIONS USING AN EGA OR VGA VIDEO INTERFACE. NOTE THAT THE SYSTEM BIOS IS ALWAYS SHADOWED. USE THE LEFT OR RIGHT ARROW KEYS TO SELECT THE DESIRED OPTION.

AT CMOS SETUP PROGRAM

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DATE: 2/4/91

TIME 13:5:29

DISKETTE 1: 1.2M
DISKETTE 2: NONE

	CYLINDERS	HEADS	SECTORS	PRECOMP	SIZE
FIXED DISK 1	11	855	5	17	NONE 37
FIXED DISK 2	NONE				
VIDEO:	EGA/VGA				
BASE MEMORY	640				
EXTENDED MEMORY	0				
MEMORY TEST	EXECUTE				
HALT CONDITIONS	HALT ON ALL ERRORS				
SHADOW VIDEO BIOS	ENABLED				
PS/2 MOUSE PORT	DISABLED				

↑ ↓ ← → changes items, ← → changes value

F8/F10 records displayed data, ESC exits, F7/F9 for color ON/OFF

THE CIRCLED AREA IS USED TO ENABLE OR DISABLE BIOS SUPPORT FOR THE ONBOARD PS/2 COMPATIBLE MOUSE PORT. WHEN THE MOUSE PORT IS ENABLED, 1K OF RAM IS RESERVED FOR THE MOUSE, LEAVING 639K OF RAM FOR THE O/S. THIS MAY BE UNDESIRABLE IN SOME APPLICATIONS. SELECT 'ENABLED' OR 'DISABLED' USING THE LEFT AND RIGHT ARROW KEYS.

AT CMOS SETUP PROGRAM
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DATE: 2/4/91

TIME 13:5:29

DISKETTE 1: 1.2M
DISKETTE 2: NONE

	CYLINDERS	HEADS	SECTORS	PRECOMP	SIZE
FIXED DISK 1:	11	855	5	17	NONE 37
FIXED DISK 2	NONE				
VIDEO:	EGA/VGA				
BASE MEMORY	640				
EXTENDED MEMORY	0				
MEMORY TEST	EXECUTE				
HALT CONDITIONS	HALT ON ALL ERRORS				
SHADOW VIDEO BIOS	ENABLED				
PS/2 MOUSE PORT	DISABLED				

↑ ↓ < > changes items, ← → changes value
F8/F10 records displayed data ESC exits, F7/F9 for color ON/OFF

THE CIRCLED AREA CONTAINS INSTRUCTIONS TO HELP MOVE AROUND INSIDE THE 985 SETUP UTILITY. REFER TO THESE WHEN SETTING THE 985. NOTICE WHEN F10 IS PRESSED, THE 985 PROMPTS YOU TO PRESS F5 TO CONFIRM. IF YOU DO NOT PRESS F5 YOU WILL NOT LEAVE THE UTILITY. PRESS F5 TO EXIT AND SAVE YOUR CHANGES.
PRESSING ESC EXITS WITHOUT SAVING CHANGES.

CAT985 CONFIGURATION PROGRAM

CAT985 CONFIGURATION PROGRAM
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SPEED CONFIGURATION

CPU SPEED	FAST
DRAM SPEED	80nS
DREQ DELAY	/AT COMPATIBLE
BALE PULSE WIDTH	/AT COMPATIBLE

BUS CONFIGURATION

8 BIT WAIT STATES	4
16 BIT WAIT STATES	1

↑ ↓ ← → changes items, ← → changes value

F8/F10 records displayed data, ESC exits, F7/F9 for color ON/OFF

THE ABOVE SCREEN IS DTI's CONFIGURATION SCREEN. THE FOLLOWING PAGES WILL TAKE YOU THROUGH EACH OF THE LINES, LISTING THE AVAILABLE OPTIONS.

CAT985 CONFIGURATION PROGRAM
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SPEED CONFIGURATION

CPU SPEED

FAST

DRAM SPEED

80nS

DREQ DELAY

/AT COMPATIBLE

BALE PULSE WIDTH

/AT COMPATIBLE

BUS CONFIGURATION

8 BIT WAIT STATES

4

16 BIT WAIT STATES

1

↑ ↓ ← → changes items, ← → changes value

F8/F10 records displayed data, ESC exits, F7/F9 for color ON/OFF

THE CIRCLED AREA IS USED TO SELECT THE SPEED OF THE 80386 WHEN
THE SYSTEM BOOTS UP. THE SPEED SHOULD BE SET TO FAST TO BOOT AT
THE RATED SPEED OF THE BOARD.

CAT985 CONFIGURATION PROGRAM
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SPEED CONFIGURATION

CPU SPEED

FAST

DRAM SPEED

80nS

DREQ DELAY

/AT COMPATIBLE

BALE PULSE WIDTH

/AT COMPATIBLE

BUS CONFIGURATION

8 BIT WAIT STATES 4

16 BIT WAIT STATES 1

↑↓ ←→ changes items, ←→ changes value

F8/F10 records displayed data, ESC exits, F7/F9 for color ON/OFF

THE CIRCLED AREA IS USED TO IDENTIFY THE SPEED OF THE DRAMs INSTALLED ON THE BOARD. NOTE THAT 80nS DRAMs ARE REQUIRED FOR NEAR ZERO WAIT STATE OPERATION.

CAT985 CONFIGURATION PROGRAM
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SPEED CONFIGURATION

CPU SPEED	FAST
DRAM SPEED	80nS
DREQ DELAY	/AT COMPATIBLE
BALE PULSE WIDTH	/AT COMPATIBLE

BUS CONFIGURATION

8 BIT WAIT STATES	4
16 BIT WAIT STATES	1

↑ ↓ ← → changes items, ← → changes value

F8/F10 records displayed data, ESC exits, F7/F9 for color ON/OFF

THE DREQ DELAY DEFINES THE TIME BETWEEN DREQ (DMA REQUEST) AND DACK/ (DMA ACKNOWLEDGE). THE CIRCLED AREA PROVIDES FOR THE SELECTION OF THIS DELAY. IN /AT COMPATIBILITY MODE, THIS DELAY IS 750nS ON 8 BIT DMA CHANNELS AND 1250nS ON 16 BIT CHANNELS. THE FAST MODE OPTION ELIMINATES THIS DELAY. THE FAST MODE WILL PROVIDE A PERFORMANCE BOOST FOR DMA DEVICES WHICH CAN OPERATE IN THE FAST MODE. NOT ALL DEVICES, HOWEVER, CAN OPERATE IN THIS HIGHER PERFORMANCE MODE.

CAT985 CONFIGURATION PROGRAM
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SPEED CONFIGURATION

CPU SPEED	FAST
DRAM SPEED	80nS
DREQ DELAY	/AT COMPATIBLE
BALE PULSE WIDTH	/AT COMPATIBLE

BUS CONFIGURATION

8 BIT WAIT STATES	4
16 BIT WAIT STATES	1

↑ ↓ ← → changes items, ← → changes value
F8/F10 records displayed data, ESC exits, F7/F9 for color ON/OFF

THE CIRCLED AREA IS USED TO SELECT THE TIMING OF THE BALE PULSE. IN /AT COMPATIBILITY MODE, THE BALE PULSE IS ASSERTED FOR ONE HALF OF ONE BUS CLOCK CYCLE. THIS PROVIDES A VERY SMALL TIMING MARGIN FOR THE ASSERTION OF THE IOCS16 AND/OR MEMCS16 LINES BY 16 BIT EXPANSION CARDS. IN EXTENDED MODE, THE BALE IS ASSERTED FOR ONE FULL BUS CLOCK CYCLE. THIS RELAXES THE TIMING MARGIN AND IMPROVES THE OPERATION OF MANY SLOWER CARDS.

CAT985 CONFIGURATION PROGRAM
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SPEED CONFIGURATION

CPU SPEED	FAST
DRAM SPEED	80nS
DREQ DELAY	/AT COMPATIBLE
BALE PULSE WIDTH	/AT COMPATIBLE

BUS CONFIGURATION

8 BIT WAIT STATES
16 BIT WAIT STATES

4
1

↑ ↓ ← → changes items, ← → changes value
F8/F10 records displayed data, ESC exits, F7/F9 for color ON/OFF

THE CIRCLED AREA IS USED TO SET THE NUMBER OF WAIT STATES FOR BUS CYCLES. WAIT STATES FOR 8 AND 16 BIT CYCLES ARE SPECIFIED INDEPENDENTLY. THE DEFAULTS ARE FOUR FOR 8 BIT AND ONE FOR 16 BIT CYCLES. SOME CARDS MAY REQUIRE ADDITIONAL WAIT STATES. IF PROBLEMS ARE EXPERIENCED WITH AN ADD-IN CARD, TRY ADDING MORE WAIT STATES.

PROM DISK CONFIGURATION

PROM DISK CONFIGURATION UTILITY
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PROM DISK SETUP

PROM MODE
BOOT SELECT

1.2M DISK
BOOTABLE

PROM DEVICE TYPE

PROM 0
PROM 1

27C020 - 256K X8 PROM
27C010 - 128K X8 PROM

↑ ↓ ← changes items, ← → changes value
F8/F10 records displayed data, ESC exits, F7/F9 for color ON/OFF

THE USER PROM WAS DESIGNED TO OPERATE IN TWO DIFFERENT MODES, THE DISKETTE EMULATION MODE AND THE BANK SWITCHED PROM MODE. IN THE DISKETTE EMULATION MODE THE PROM DISK EMULATES A 360K, 1.2M, 720K, OR A 1.44M FLOPPY DISKETTE. THE CIRCLED AREA IS USED TO SELECT THE MODE OF OPERATION OR TO DISABLE THE PROM DISK SUPPORT IN THE BIOS. NOTE THAT WHENEVER ONE OF THE OPERATIONAL MODES IS ENABLED, THE PROM IS BANK SWITCHED IN 64K BYTE BLOCKS INTO EITHER THE E000h OR D000h SEGMENT. SWITCH SW1-1 ENABLES/DISABLES THE USER PROM AND SW1-3 SELECTS THE PROM ADDRESS. REFER TO SECTION 2 FOR DEFINITIONS OF THESE SWITCHES.

THE PROM DISK MODE IS ENABLED BY SELECTING ONE OF THE FOUR DISKETTE TYPES. IF THE PROM DISK IS BOOTABLE AND SELECTED AS BOOTABLE IN THE BOOT SELECT OPTION, THE PROM DISK WILL BE ACCESSIBLE AS DRIVE A; OTHERWISE THE PROM DISK WILL SHOW UP AS THE LAST FLOPPY DRIVE IN THE SYSTEM. (i.e. IF THERE ARE TWO PHYSICAL FLOPPY DRIVES IN THE SYSTEM, THE PROM DISK WILL BE DRIVE C;, AND THE FIRST PHYSICAL HARD DRIVE WILL BE DRIVE D:.)

SELECTING THE USER PROM MODE ENABLES THE BANK SWITCHED PROM MODE. THIS MODE PROVIDES FLEXIBILITY IN THAT THE USER PROM CAN BE USED IN APPLICATION SPECIFIC SITUATIONS. THIS MODE IS NOT SUPPORTED BY THE BIOS AND REQUIRES CUSTOM CODE TO ACCESS THE PROM.

WHEN DISABLED, THE OTHER PARAMETERS IN THE PROM DISK CONFIGURATION UTILITY ARE NOT USED AND ARE DISPLAYED AS N/A.

PROM DISK CONFIGURATION UTILITY
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PROM DISK SETUP

PROM MODE

BOOT SELECT

12M DISK

BOOTABLE

PROM DEVICE TYPE

PROM 0

27C020 - 256K X 8 PROM

PROM 1

27C010 - 128K X 8 PROM

↑ ↓ ↘ changes items, ← → changes value
F8/F10 records displayed data, ESC exits, F7/F9 for color ON/OFF

THE CIRCLED AREA IS USED TO SPECIFY WHETHER OR NOT THE SYSTEM SHOULD TRY TO BOOT FROM THE PROM DISK. IF THE SYSTEM TRIES TO BOOT FROM A NON-BOOTABLE PROM DISK, AN ERROR MESSAGE WILL BE DISPLAYED, THE PROM DISK WILL BECOME THE LAST FLOPPY IN THE SYSTEM, AND THE SYSTEM WILL CONTINUE A NORMAL BOOT SEQUENCE.

PROM DISK CONFIGURATION UTILITY
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PROM DISK SETUP
PROM MODE
BOOT SELECT

1.2M DISK
BOOTABLE

PROM DEVICE TYPE
PROM 0
PROM 1

27C020 - 256K X 8 PROM
27C010 - 128K X 8 PROM

↑ ↓ ← changes items, ← → changes value
F8/F10 records displayed data, ESC exits, F7/F9 for color ON/OFF

THE PROM DEVICE TYPES SPECIFY THE AMOUNT OF PROM INSTALLED. THIS INFORMATION IS USED BY THE BIOS IN ITS CALCULATIONS TO DETERMINE WHICH PROM TO ACCESS IN A PROM DISK READ AND IS ONLY VALID IN DISK EMULATION MODE. THE CAT985 SUPPORTS PROM DEVICE TYPES OF 64K x 8, 128K x 8, AND 256K x 8. HOWEVER, PROM 0 MUST BE INSTALLED AS THE FIRST PROM. IF BOTH PROMS ARE USED AND ARE NOT THE SAME DEVICE TYPE, THEN THE LARGER DEVICE MUST BE INSTALLED IN PROM 0. PROM 0 IS LOCATED AT U33 JUST ABOVE THE BUS CONNECTOR OF THE CAT985. IF THE PROM DEVICE TYPES ARE SET UP IN AN INVALID CONFIGURATION, AN ERROR MESSAGE WILL BE DISPLAYED ON THE SCREEN. SAVING THE PROM DISK CONFIGURATION WILL NOT BE ALLOWED IF AN INVALID CONFIGURATION EXISTS. TO EXIT THE UTILITY WITHOUT SAVING ANY PARAMETERS PRESS <ESC>.

CUSTOM DRIVE TYPE

CUSTOM DRIVE TYPE INSTALLATION UTILITY

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Enter the custom drive type parameters for drive types 48 and 49 into the table below, then reboot the system to install the parameters.

TYPE	CYLINDERS	HEADS	PRECOMP	LANDING ZONE	SECTORS
48	1024	7	NONE	1024	17
49	614	4	NONE	0	17

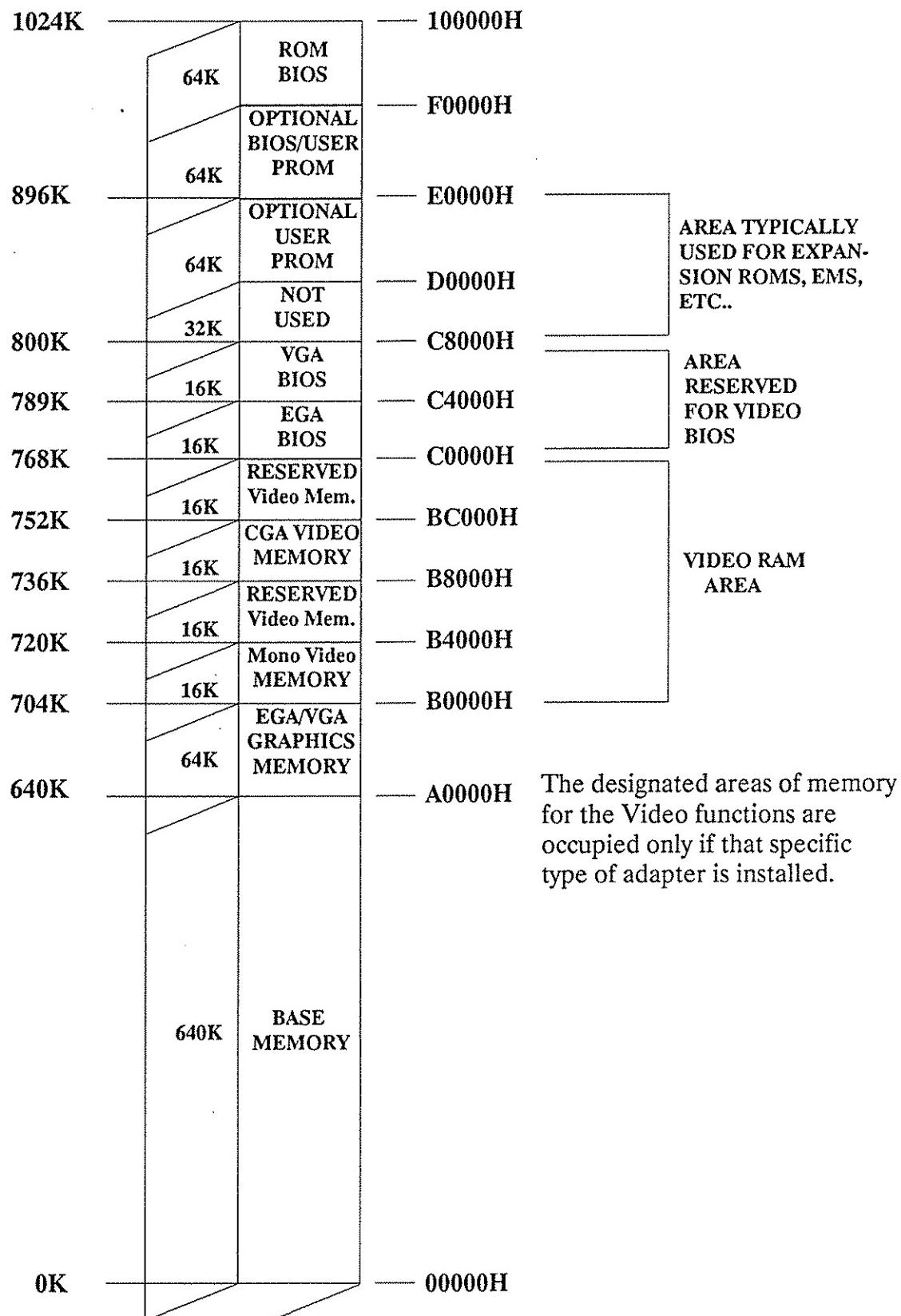
↑, ↓, ↘ changes item, or ←, → changes value

F8/F10 records displayed data, ESC exits, F7/F9 for color ON/OFF

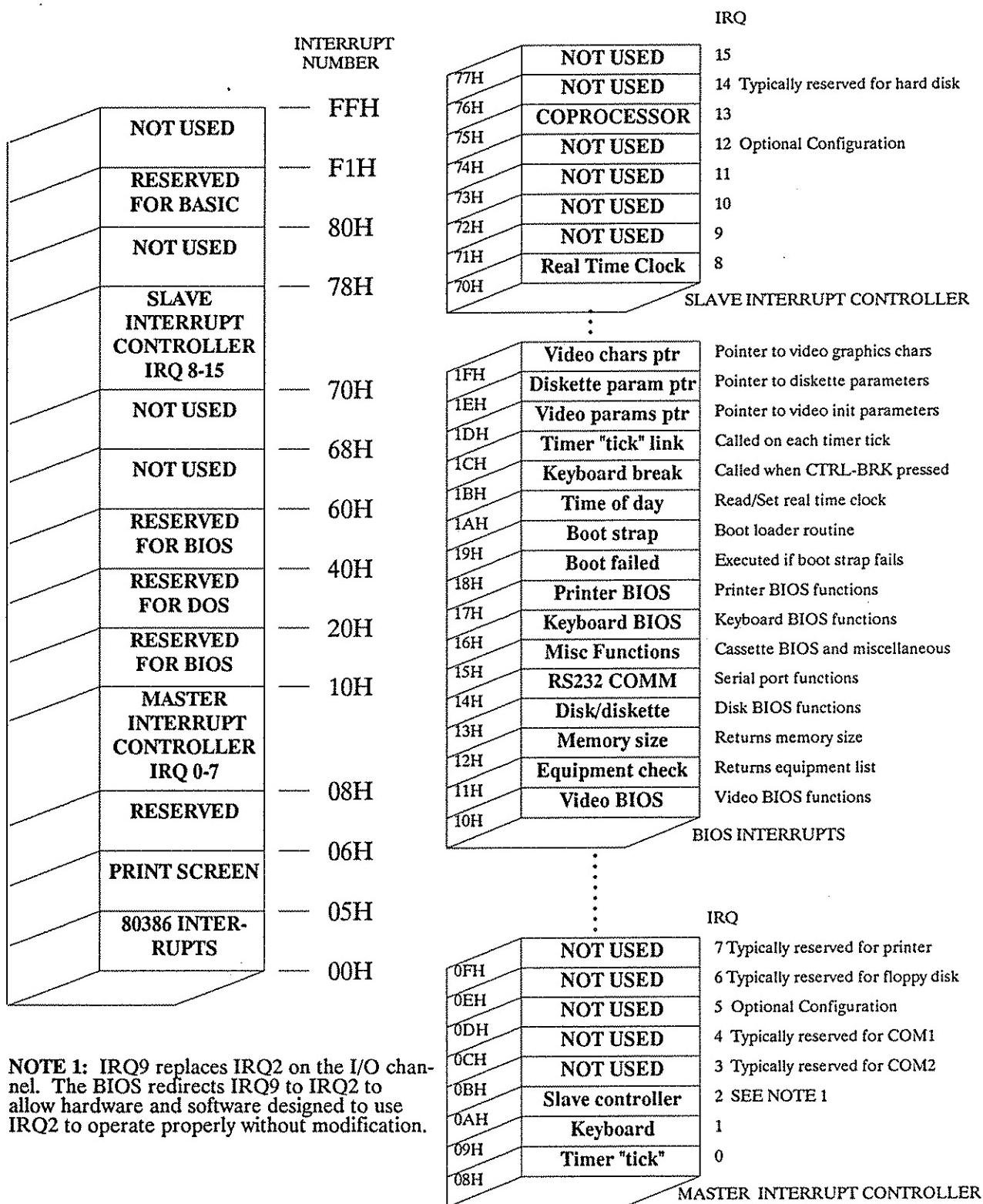
THE DISK DRIVE TABLES STORED IN ROM CANNOT POSSIBLY CONTAIN THE PROPER PARAMETERS FOR EVERY DISK DRIVE ON THE MARKET. BY ENTERING THE PHYSICAL PARAMETERS OF THE DRIVE, USING THIS UTILITY, A CUSTOM DRIVE TYPE CAN BE CREATED FOR THE TARGET DRIVE. THE CAT985 WILL SUPPORT TWO CUSTOM DRIVE TYPES.

TO ENTER THE PARAMETERS, MOVE THE HIGHLIGHTED BAR OVER THE PARAMETER TO BE MODIFIED. TYPE IN THE CORRECT VALUE AND PRESS ENTER. IF THE VALUE TO BE ENTERED IS SPECIFIED AS NONE IN THE DRIVE MANUFACTURER'S SPECIFICATIONS, ENTER 9999 AND PRESS ENTER. THE VALUE DISPLAYED WILL THEN BE NONE.

SECTION 6 CAT985 MEMORY MAP



CAT985 INTERRUPT MAP



NOTE 1: IRQ9 replaces IRQ2 on the I/O channel. The BIOS redirects IRQ9 to IRQ2 to allow hardware and software designed to use IRQ2 to operate properly without modification.

CAT985 I/O ADDRESS MAP

	SERIAL COM 1	400H
2	FLOPPY DISK CONTROLLER	3F8H
2	UNUSED	3F0H
1	ENHANCED GRAPHICS	3E0H
2	COLOR GRAPHICS	3D0H
2	MDPA PRINTER PORT	3C0H
2	MONOCHROME DISPLAY	3BCH
2	UNUSED	3B0H
1	PRIMARY PRINTER PORT	380H
2	UNUSED	378H
1	SERIAL COM 2	300H
2	UNUSED	2F8H
1	ALTERNATE PRINTER PORT	280H
2	UNUSED	278H
1	FIXED DISK CONTROLLER	1F8H
2	UNUSED	1F0H
1	RESERVED FOR SYSTEM	100H
0		000H

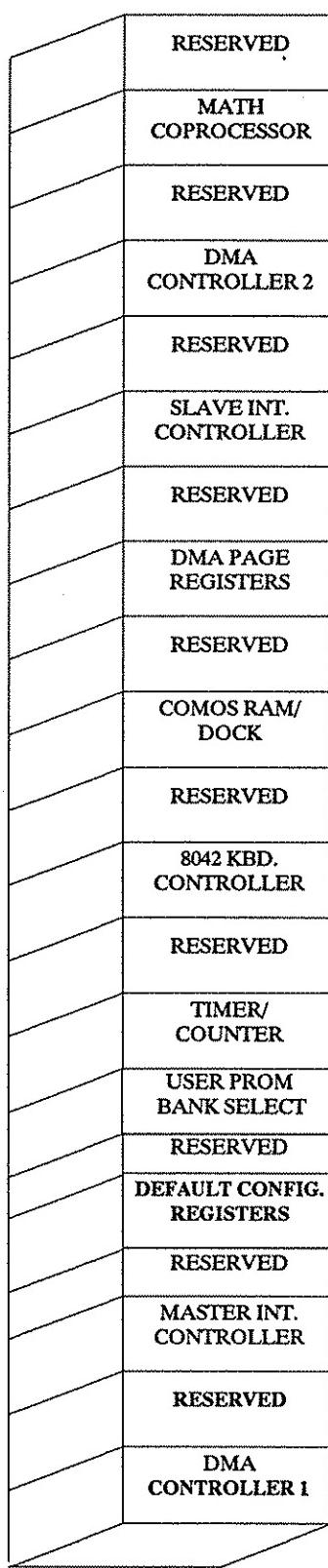
0 - These I/O locations are reserved for ONBOARD functions and must not be used by expansion I/O cards.

1 - These I/O locations are unused by the CAT985, and may be used by expansion I/O cards or for custom configuration of onboard peripherals (serial and parallel ports).

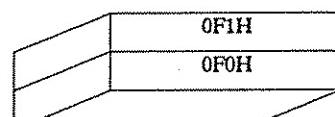
2 - These I/O locations are unused by the CAT985, but are typically used by common expansion I/O cards.

All I/O addresses are decoded using A0-A9 only. This causes reflection of the I/O devices to occur at I/O addresses above 400h for which A0-A9 correspond to the I/O addresses listed.

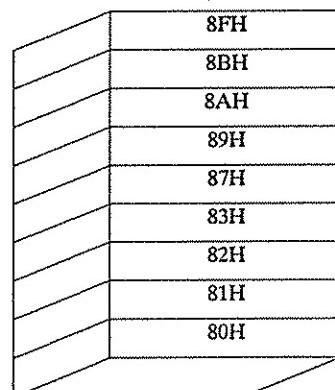
CAT985 SYSTEM BOARD I/O MAP



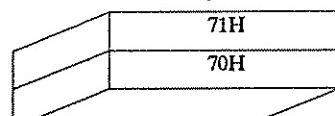
I/O ADDRESSES 0840H THROUGH 084FH ARE RESERVED FOR EXTENDED DMA PAGE REGISTERS. THESE REFLECT INTO THE TIMER/COUNTER RESERVED ADDRESSES AND SHOULD NOT CONFLICT WITH ANY BUS-ADDRESSABLE DEVICES.



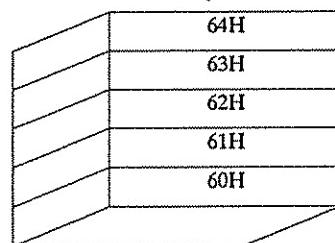
RESET MATH COPROCESSOR
CLEAR MATH COPROCESSOR BUSY



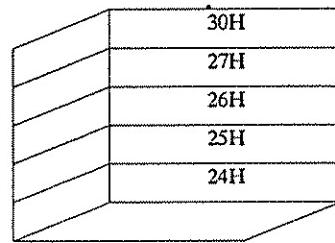
REFRESH PAGE REGISTER
DMA CHANNEL 5 PAGE REG.
DMA CHANNEL 7 PAGE REG.
DMA CHANNEL 6 PAGE REG.
DMA CHANNEL 0 PAGE REG.
DMA CHANNEL 1 PAGE REG.
DMA CHANNEL 3 PAGE REG.
DMA CHANNEL 2 PAGE REG.



CMOS RAM DATA
CMOS RAM INDEX



8042 COMMAND/STATUS REG.
SPEED SELECT REGISTER



PORT B
8042 DATA REGISTER

USER PROM SELECT
CONFIG INDEX (16)
CONFIG DATA (16)

ALL I/O ADDRESSES ARE DECODED USING A0-A9 ONLY. THIS CAUSES REFLECTION OF THE I/O DEVICES TO OCCUR AT I/O ADDRESSES ABOVE 400h FOR WHICH A0-A9 CORRESPONDS TO THE I/O ADDRESSES LISTED ABOVE.

SECTION 7 CAT985 TROUBLESHOOTING GUIDE

IN THIS TROUBLESHOOTING GUIDE

Capitalized statements within quotation marks are messages that are displayed on your screen. Statements not in quotation marks are problems, or problem areas, that are encountered.

NO VIDEO

1. Verify that the monitor is on and has power.
2. Verify that the video cable is connected properly to the video card.
3. Verify that power is connected to the computer.
4. Verify that all cards in the backplane are fully inserted into the socket. Turn the power off before doing this.
5. Remove all connectors from the reset, battery, keylock and speaker ports. If the video works after removing the connectors, review the port connections in Section 3.
6. Verify that the monitor type is the same as the video card type being used (i.e. a monochrome monitor with a monochrome card or a color monitor with a CGA card, etc.).

DISPLAYS "DIVERSIFIED TECHNOLOGY" AND STOPS.

1. If a switchable keyboard is being used, verify that the switch is set for an /AT keyboard.
2. Verify that all cards in the backplane are fully inserted into the socket. Turn the power off before doing this.

CAT985 APPEARS TO HAVE LOCKED UP (NO ACTION GENERATED BY PRESSING A KEY)

1. If two video cards are installed (e.g. EGA and MONO, or VGA and CGA), verify that the primary monitor is connected. With the power OFF, remove the unused or secondary video card.
2. If an /XT hard drive controller is used, use the SETUP utility to verify that no /AT hard drive type is specified. To accomplish this, turn the power OFF and remove the hard drive controller from the system. Turn the power ON and wait for the system to sign on. This may take 1 to 2 minutes if a hard drive type is specified. Enter the SETUP Utility and specify NONE for the hard drive type. With the power OFF, replace the /XT hard drive controller.

PARITY PROBLEMS

1. Verify that the memory SIMMs are inserted properly in their respective sockets (refer to the CAT985 memory configuration).
2. Change the CPU speed to LOW using the SETUP utility.
3. Verify that the DRAM is fast enough to operate at the speed for which the CAT985 is configured. The required DRAM speed is dependent on the wait states set in the AT setup screen. See Section 2 for the correct values.

"Invalid configuration information - please run SETUP program"

This message typically indicates that the SETUP information stored in CMOS RAM does not match the hardware identified by the POST.

1. Use the SETUP Utility to verify that the FLOPPY DRIVE TYPE, FIXED DRIVE TYPE, VIDEO TYPE, and MEMORY SIZE are set correctly. If the memory configuration has changed, the SETUP information will appear to be correct. If everything appears to be correct, press F10, and then F5 to save the displayed configuration.
2. If an add-in memory card is used to extend the memory capabilities of the CAT985, verify that the add-in card is properly configured, and the SETUP Utility reflects the size of the installed memory. The memory test which executes on power-up will indicate the size of both the BASE and EXTENDED memory found by the Power-ON Self Test (POST).
3. Verify that the power connector is connected to the drive.

"Diskette subsystem reset failed"

This message indicates that the POST was unable to initialize the floppy disk controller.

1. Verify that a controller is present and is seated properly in the backplane.

"Diskette drive 0 seek failure"**"Diskette drive 1 seek failure"**

This message indicates that the POST was unable to access the designated floppy disk drive.

1. Use the SETUP Utility to verify that no drive type is specified for a drive that does not exist.
2. Verify that the floppy cable is properly connected to the drive and controller with pin 1 properly oriented at both ends. The twisted section of the floppy cable should be between the controller and drive A.
3. Verify that the power connector is connected to the drive.
4. Verify that a controller is present in the system and is seated properly in the backplane.

**"No boot device available -
Strike F1 to retry boot"**

This message indicates that no floppy disk or hard disk could be found to boot from.

1. If booting from a floppy disk, verify that the disk is properly inserted and the drive door is closed.
2. Insert a different bootable floppy disk into the drive and press F1.
3. If attempting to boot from a hard disk, insert a bootable floppy disk into drive A and press ENTER. After booting from the floppy disk, verify that drive C is accessible. Use the FDISK (or similar) utility to verify that a bootable partition exists and is ACTIVE. Remove the floppy disk from drive A and reset the system. If the drive cannot be accessed or a partition cannot be found, the drive may need to be reformatted.
CAUTION: Reformatting a drive causes the data on the drive to be lost.
4. If attempting to boot from a hard disk, use the SETUP Utility to verify that the correct **FIXED DISK TYPE** is configured.

**"Diskette read failure-
strike F1 to retry boot"
or
" Not a boot diskette-
strike F1 to retry boot "**

This message indicates that a floppy disk appeared to be in the drive, but a valid boot sector could not be read from the disk.

1. Verify that the disk is properly inserted and the drive door is closed.
2. Insert a different bootable floppy disk into the drive and press F1.

"INVALID BOOT SECTOR...CANNOT BOOT FROM PROM DISK."

This message indicates that the system sees the Disk Emulator as a boot device but can't find a valid boot sector.

1. Verify that the floppy used to create the Disk Emulator PROMs is bootable.
2. Verify that the PROMs have been inserted according to the table in Appendix A.
3. If booting from a floppy disk, verify that the Disk Emulator is set as non-bootable in the Rom Utilities.

**"Hard disk read failure -
strike F1 to retry boot"**

or

**"No boot sector on hard disk -
strike F1 to retry boot"**

This message indicates that the POST was unable to access the hard disk using the FIXED DISK TYPE parameters specified in the SETUP Utility.

1. Use the SETUP Utility to verify that the correct FIXED DISK TYPE is configured.
2. Insert a bootable floppy disk into drive A and press F1. After booting from the floppy disk, verify that drive C is accessible. Use the FDISK (or similar) utility to verify that a bootable partition exists and is ACTIVE. Remove the floppy disk from drive A and reset the system. If the drive cannot be accessed or a partition cannot be found, the drive may need to be reformatted.

CAUTION: Reformatting a drive causes the data on the drive to be lost.

"Hard disk controller failure"

1. If no hard disk is installed, use the SETUP Utility to specify NONE for FIXED DISK TYPE.
2. If an /AT hard disk controller is installed, turn the power OFF and verify that the controller is properly seated in the backplane.

"Hard disk failure"

This message indicates that the POST was unable to access the hard disk using the FIXED DISK TYPE parameters specified in the SETUP Utility.

1. Verify that the hard drive has power connected to it.
2. Verify that the hard disk cables are connected properly.
3. Enter the SETUP utility (refer to Section 5) and verify the hard disk type. Refer to the manufacturer's specifications on the hard drive for configuration information.
4. The drive may need to be formatted. **WARNING:** this will cause loss of all data on the drive.

"Hard disk configuration error"

This message indicates that the FIXED DISK TYPE specified in the SETUP Utility was not valid. This typically occurs when the specified type has 0 for the number of cylinders.

1. A hard disk type with 0 cylinders was chosen in the SETUP utility. Enter the SETUP utility (refer to Section 5) and change the configuration to the type of drive present.

"Time-of-day clock stopped"

"Time-of-day not set - please run SETUP program"

This message indicates that the battery backed real time clock is not set correctly or has failed.

1. Use the SETUP Utility to set the time and date.

"XXXX0h Optional ROM bad checksum = YY"

This message indicates that the POST identified an expansion ROM signature at segment XXX, but the checksum was not 0. This typically indicates that the ROM is invalid or is too slow to be accessed by the current configuration of the CAT985.

1. Set E1 to set the AT bus speed to 6 MHZ.
2. For eight bit boards, use the advanced setup utility to increase the 8 bit wait states. Use the minimum number of wait states which provide reliable operation.
3. For sixteen bit boards, use the advanced setup utility to increase the number of 16 bit wait states. Use the minimum number of wait states that provides reliable operation.

"I/O card parity error"

This message indicates that an I/O card activated the I/O channel check signal, which is typically used to indicate a RAM parity error on an add-in card. This may occur if the card is too slow to be accessed by the current configuration of the CAT985.

1. Set E1 to set the AT bus speed to 6 MHZ.
2. For eight bit boards, use the advanced setup utility to increase the 8 bit wait states. Use the minimum number of wait states which provide reliable operation.
3. For sixteen bit boards, use the advanced setup utility to increase the number of 16 bit wait states. Use the minimum number of wait states that provides reliable operation.

SERIAL OR PARALLEL (PRINTER) PORT PROBLEMS.

1. Verify that the peripheral device has power and is turned on.
2. Verify that the peripheral device is properly connected to the serial or parallel port.

"Keyboard is locked - please unlock"

This message indicates that the keyboard appears to be in the LOCKED position.

1. Verify that the system key is not in the locked position.
2. Verify that the keylock wires are connected to pins 4 and 5 of connector J1.

POWER LED DOES NOT WORK

1. Verify that the LED is connected to pins 1 and 3 of J1.
2. Verify that the polarization of the connection is correct. This can be checked by reversing the pin connections.

RESET BUTTON DOES NOT WORK

1. Verify that the RESET button is connected into pins 1 and 2 of connector J4

CONFIGURATION INFORMATION IS NOT RETAINED

1. If using the onboard battery, make sure that a jumper is placed between pins 2 and 3 of J3.
2. If using an offboard battery, check the voltage on the battery. If it is low, replace it. Also, be sure that the battery is connected to the proper pin on J3.
3. When setting the configuration, you must save the new settings by pressing the proper F keys. If the setup menu is exited using CTRL-ALT-DEL, the settings are not retained.

SERVICE CALL PREPARATIONS

If you are still having problems with your CAT985 you can call one of our service representatives. Before you make this call, we ask that you please take the following steps to insure that your problem can be solved promptly.

1. Write down the equipment that you are using in your computer such as model of hard drive, hard drive controller, video card, floppy card, etc.
2. Write down the switch settings of the CAT985. Refer to Section 2 for jumper configurations.
3. Write down the configuration information contained in the CAT985 ROM utilities.
4. If possible, have the system near the telephone when you call.

Our phone number for sales information is 1-800-443-2667. For technical information, call 601-856-4121 and ask to speak to one of our service representatives.

SECTION 8 CAT985 SERVICE INFORMATION

RETURN SHIPMENT

If service or repair is required, contact DTI's Service Department for a Return Material Authorization (RMA) number and shipping instructions. If the product is out of warranty, or was damaged during shipment, a purchase order will be required for the repair. The product should be returned in its original shipping materials if available. Otherwise, the board should be placed in a conductive anti-static material, wrapped in a cushioning material and enclosed in a corrugated carton suitable for shipping. Seal the carton securely and ship prepaid to the following address with the RMA number on the label.

DIVERSIFIED TECHNOLOGY
Service Department
112 E. State Street
P. O. Box 748
Ridgeland, MS 39158
RMA# _____

Contact the Service Department at the following numbers:

Telephone: (601)-856-4121
FAX: (601)-856-2888

Items determined to be covered under warranty will be returned freight prepaid. Items not in warranty will be returned freight collect, contact DTI's Service Department.

APPENDIX A
PROM DISK GENERATION

DISKETTE EMULATION INFORMATION

This section explains the process to create a PROM DISK to be used on the CAT985 board if EPROMs are being used. Refer to Appendix B if using flash memory devices. The DSK2PROM and BIN2HEX utilities on the supplemental diskette supplied with the CAT985 board will be used to generate the PROM files. These utilities should be executed from a hard drive which has enough free space to store the diskette image files.

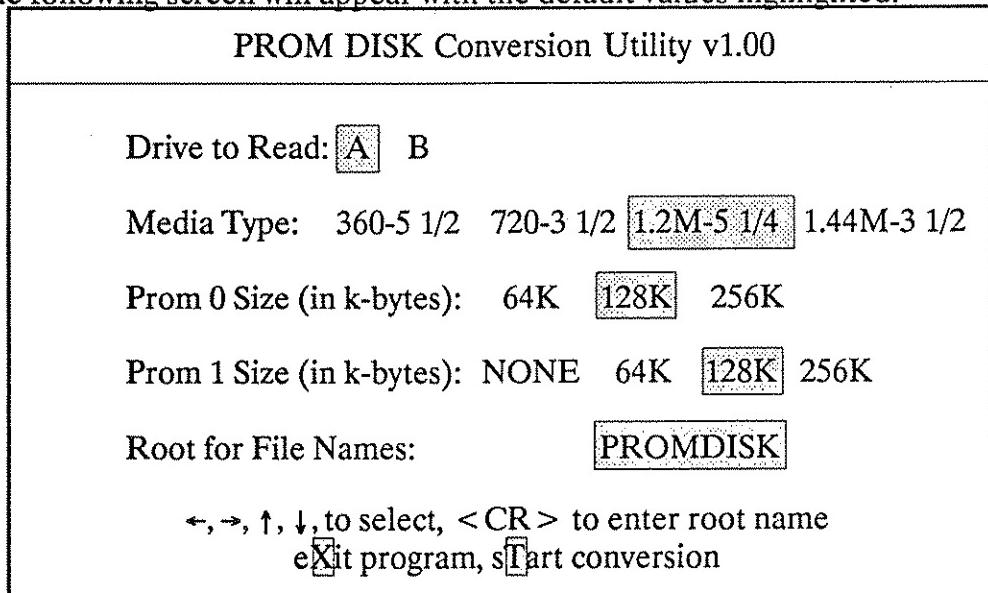
The diskette emulator can emulate a 360K, 1.2M, 720K, or a 1.44M floppy diskette. If the emulator (PROM DISK) is bootable and selected as bootable in the BOOT SELECT option, the PROM DISK will be accessable as drive A:, otherwise the PROM DISK will show up as the last floppy drive in the system. (i.e. If there are two physical floppy drives in the system, the PROM DISK will be drive C:, and the first physical hard drive will be drive D:) The PROM Disk defaults to drive B: if no physical floppies exist and the PROM Disk is not selected as bootable.

Step 1

Create a source diskette from which a PROM image will be created. Use a freshly formatted diskette to create the source diskette. Format the diskette with the "/s" option if the PROM DISK is to be bootable. Copy files that are to be in the PROM DISK onto the source diskette. Keep in mind the amount of PROM being used and limit the files to what the PROM DISK will hold. In other words, don't fill up an entire 360K floppy when only a 256K PROM is to be used. This will cause files to show up in the directory that don't exist.

Step 2

Execute DSK2PROM to generate binary image files of the floppy. When the utility is started the following screen will appear with the default values highlighted:



In selecting the PROM sizes it should be noted that PROM 1 cannot be installed if PROM 0 is not installed and that PROM 1 cannot be larger than PROM 0. The "Root for File Names:" is the name of the files to be created by the DSK2PROM utility without the extension. The files created will be in the following form:

```
<rootname>.000 - PROM 0
<rootname>.001 - PROM 1
```

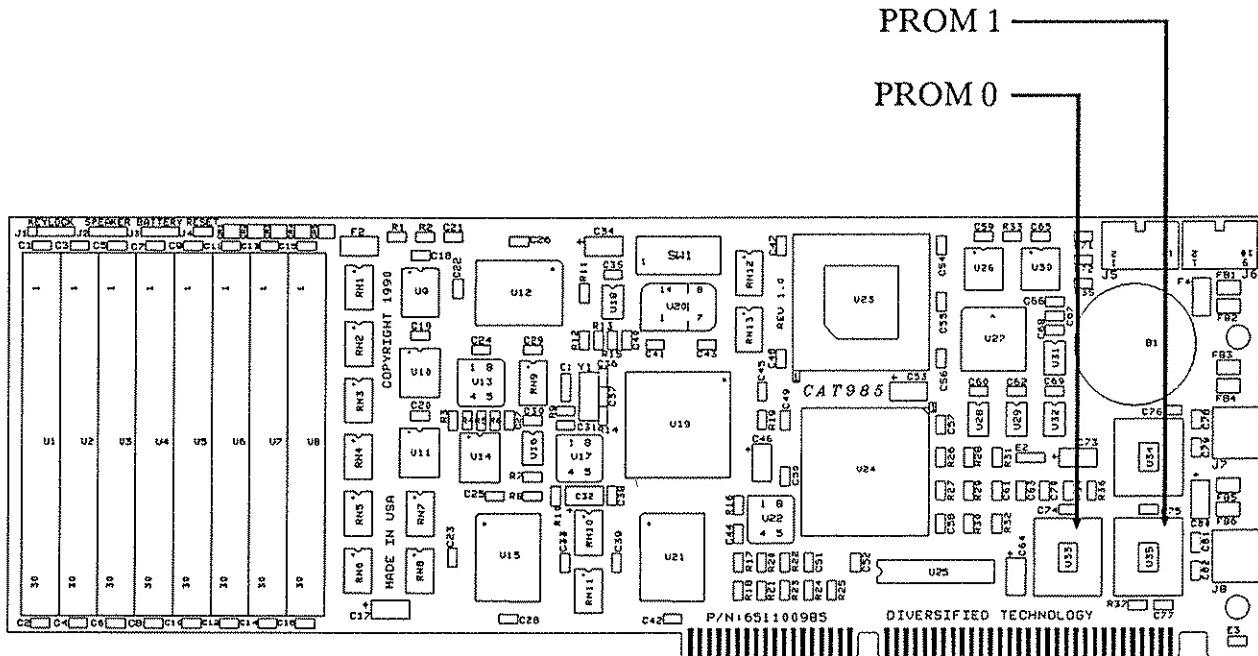
The program prompts for the insertion of the source diskette after the conversion has been started by pressing "T".

Step 3

Program PROMS. If the programmer to be used accepts hex files rather than binary files, use the BIN2HEX utility to convert the binary files into hex files. The usage of the utility is as follows: BIN2HEX rootname.000 target.fil, where target.fil is the target filename and extension of the target hex file. Be sure to label the PROMS correctly after programming.

Step 4

Placement of PROMS onto the CAT985.



APPENDIX B

FLASH MEMORY

TABLE OF CONTENTS

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USING THE FLASH PROGRAMMER UTILITY	B3-1
USING THE FLASH TSR	B4-1

SECTION B1 PRODUCT OVERVIEW

The CAT985 was designed with built-in support for FLASH memory devices. This provides the user the ability to create FLASH diskettes to which may contain boot files, frequently used applications, or a complete embedded application. Flash memory devices are field upgradable without removing them from the CAT985.

Flash memory is a non-volatile, electrically erasable device with characteristics similar to EEPROM. Unlike EEPROM, however, the entire flash device must be erased before it can be reprogrammed. The DRAM-like access time and field programmability of flash memory makes it an ideal alternative to EPROM diskette emulators. Flash diskettes are very fast to read, require no spin-up time, and are very reliable since there are no moving parts to wear out. The life expectancy of flash devices is around 10,000 erase/write cycles.

The CAT985 supports up to 512k bytes of flash memory. A simple jumper configuration provides the voltage necessary to enable onboard programming of the flash memory. The jumper can optionally be configured to provide write-protected read-only memory.

Two utilities have been provided for accessing the flash memory devices. The flash can be accessed directly by applications programs using the FTSR program or interactively updated through the use of the menu-driven flash programmer utility, FLASH. FTSR is a memory resident program which provides flash device read, write, and erase capabilities to application programs through software interrupt 15h. FLASH is a menu-driven interactive utility which provides erase, program, copy, checksum, and blank check functions similar to those of a typical PROM programmer. In addition it provides a disk copy function for creating or updating flash boot devices or embedded applications.

The CAT985 supports up to 512K bytes of flash memory. This memory can be used as a flash disk to emulate a floppy diskette or as application specific read/write or read-only memory. Diskette emulation support is included in the standard CAT985 system BIOS.

The following files can be found on the CAT985 Supplimental Diskette:

- FLASH.EXE - Interactive menu-driven flash programming utility.
- FTSR.EXE - Memory-resident utility which provides a flash programming interface for applications programs.
- FTYPE.EXE - Diagnostic utility which displays the manufacturer and device type of the installed flash devices.
- FINSTALL.BAT - Batch loader for the FTSR.EXE program.

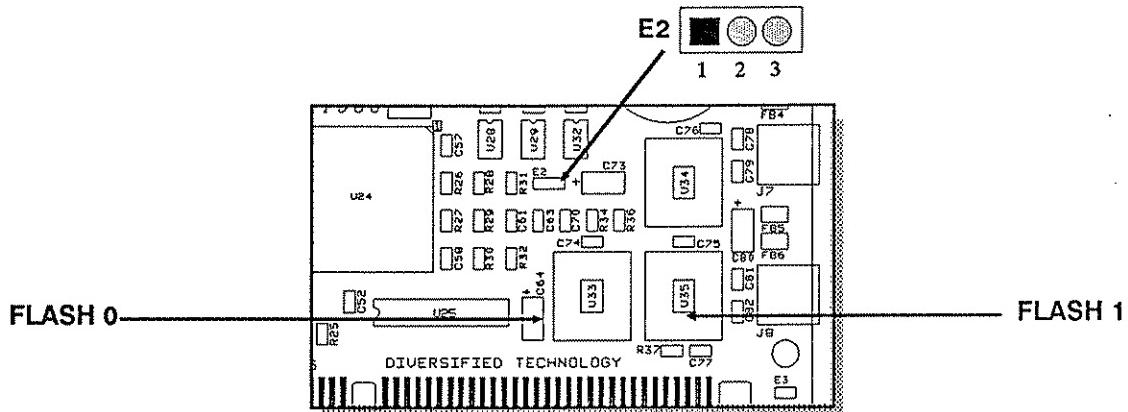
SECTION B2 HARDWARE CONFIGURATION

Flash support on the CAT985 is enabled through the setting of switch 1-1 to enable the flash chip selects and jumper E2 to select the proper input voltage for the device(s) installed.

Switch 1-1 must be "OFF" to enable the flash chip selects.

Jumper E2 on the CAT985 selects the input voltage for device(s) installed in U33 and U35. For PROM devices, the jumper must be on pins 1-2. Erasing or writing flash devices requires that the jumper be on pins 2-3. Flash devices can be write-protected by placing the jumper on pins 1-2.

Refer to the figure and table below to insert the flash memories onto the CAT985.



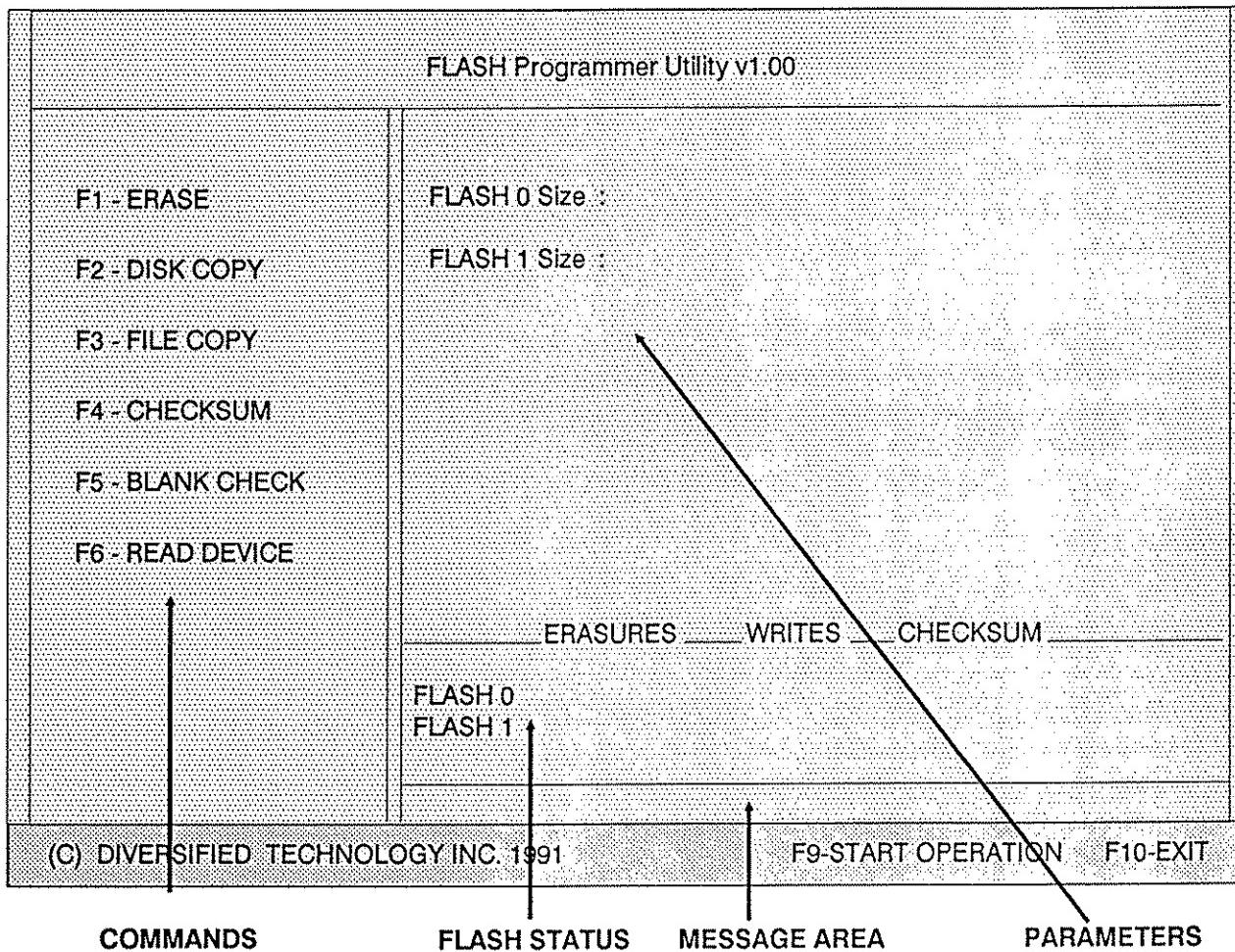
SETTINGS FOR JUMPER E2		
Pins	Voltage	Used for:
1-2	5V	Reading Flash
2-3	12V	Erasing or writing Flash

SECTION B3

USING THE FLASH PROGRAMMER

3.0 Getting Started

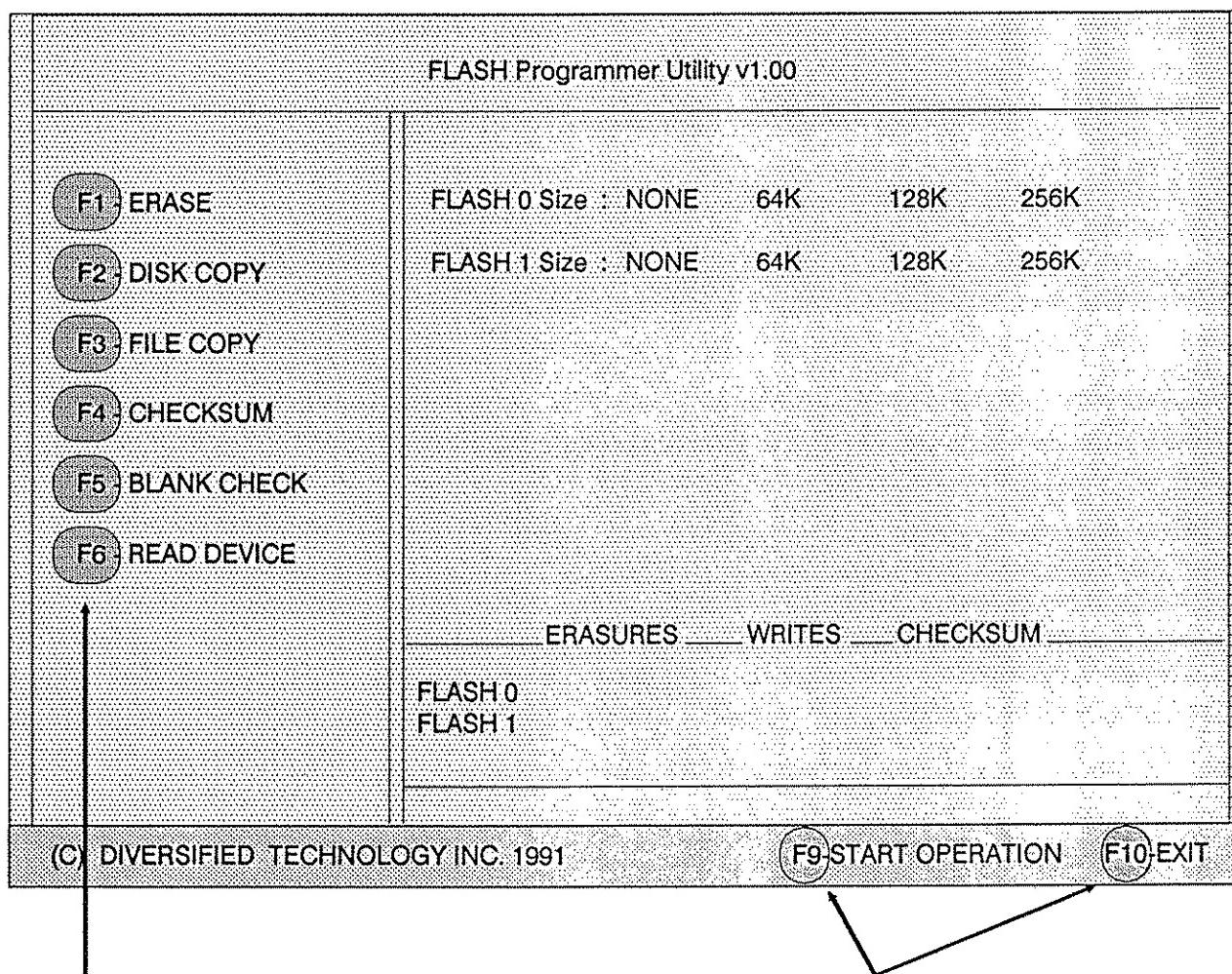
The FLASH.EXE utility is an interactive menu-driven utility which provides programming capabilities similar to those found on a typical PROM programmer. The utility also provides a DISK COPY function for creating or updating a flash "diskette" on the CAT985. To start the FLASH utility from the DOS prompt, type "FLASH" and press ENTER. The following screen will then be displayed.



The flash programmer screen is divided into four areas. The first area, labeled "COMMANDS" above, lists the functions provided by the FLASH utility. The "PARAMETERS" area is used to specify the information required to program the flash devices. The "FLASH STATUS" and "MESSAGE" areas are used to provide information to the user.

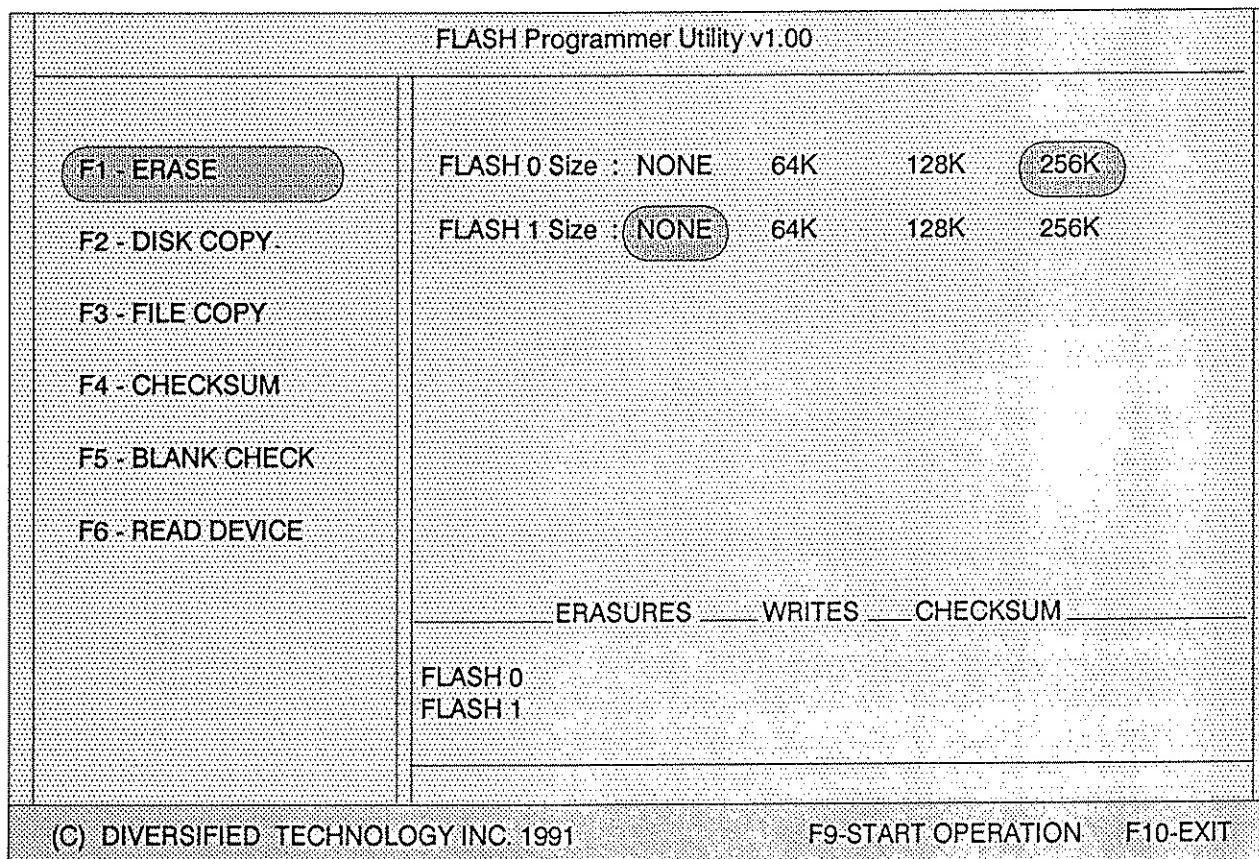
3.1 Commands

Commands are selected by pressing the function key associated with a particular command. The function keys are displayed in the "COMMAND" area of the screen beside the list of commands. When the function key is pressed, the parameters associated with that command are highlighted in the "PARAMETERS" area of the screen. After the parameters are entered, press function key F9 to execute the command, or F10 to return to the main menu.



The function keys, F1-F6, are used to select the desired commands.

The function keys, F9 and F10, are used to select the operations to be performed.



ERASE

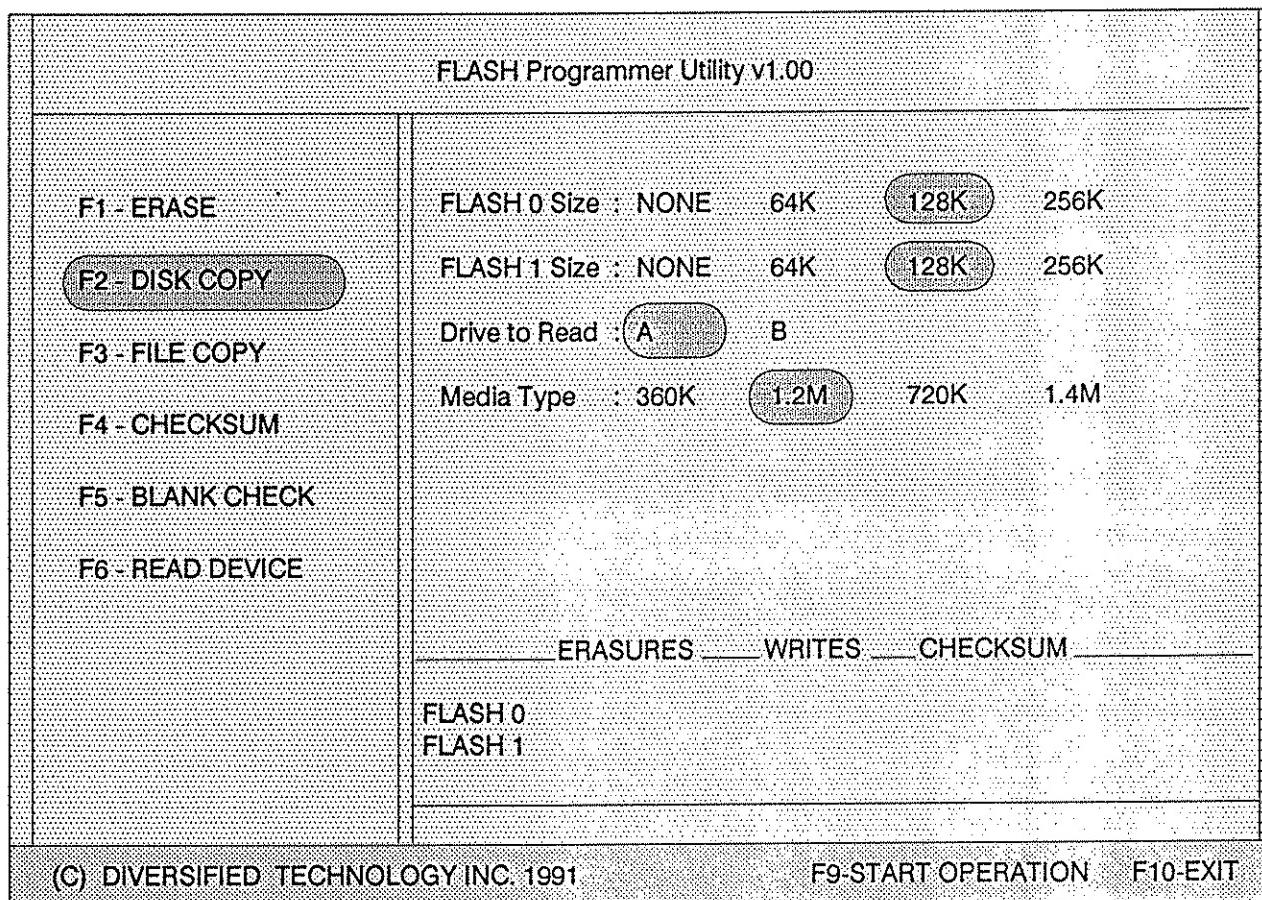
The "ERASE" command erases every enabled flash device. The erase command is repeated up to 3000 iterations, with each command followed by an erase verify command to insure that the device is fully erased. When the device is completely erased, all bits in the device are "1".

A single device can be erased by selecting the size of all other devices to be "NONE". This procedure can be repeated to erase each device individually, or all devices can be erased by selecting the appropriate size for each device before the "ERASE" command is started.

If the "ERASE" command fails to erase any device, an error message is displayed to indicate the type of failure which occurred. If no error occurs, the message "OPERATION COMPLETE" is displayed in the "MESSAGE" area.

After the "ERASE" command is completed and all data is verified to be erased, the "FLASH STATUS" area is updated with the new device checksum, the number of iterations of the "ERASE" command required to fully erase the device, and the maximum number of iterations required to write zeros to the device prior to issuing the "ERASE" command.

The specified size must match the size of the installed device in order to avoid potential damage to the device. All data is written to zero prior to issuing the "ERASE" command to insure that all bits are erased simultaneously, and that already erased bits are not overdriven.

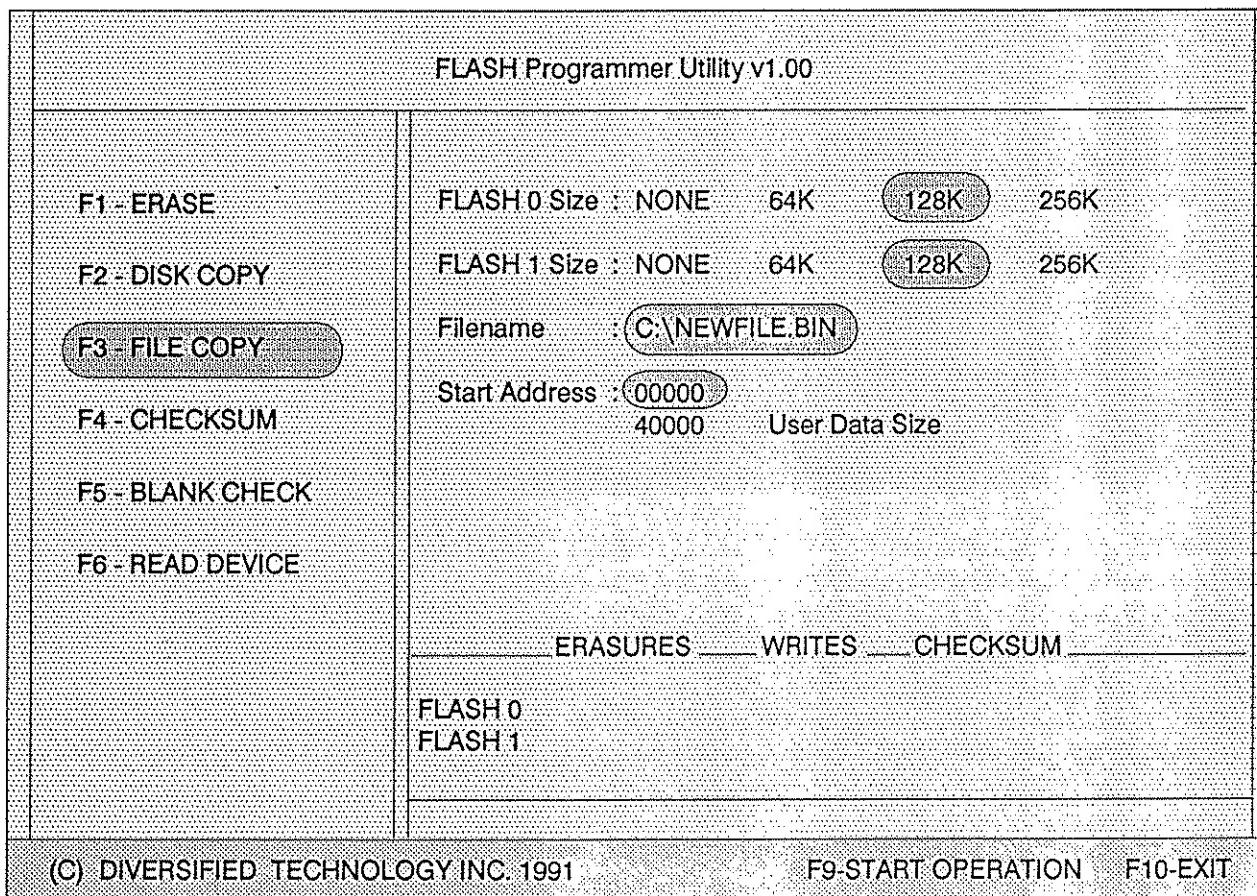


DISK COPY

The "DISK COPY" command copies the contents of the specified floppy drive to the enabled flash devices to create a diskette emulator. The size of each installed flash device should be correctly specified and all devices erased before this command is started. Before the command is started, the drive and media type of the source diskette must be specified.

The data on the source diskette is copied directly to the flash devices, not into a file structure on the diskette emulator. Therefore, the source diskette must contain less data than the total size of the installed flash devices and the data must not be fragmented. The best way to accomplish this is to start with a freshly formatted floppy disk. To make the flash disk bootable, format the floppy with the "/s" option. Copy the files intended for the flash disk onto the floppy disk, without deleting any files after they are copied.

The DOS CHKDSK utility can be used to identify the total amount of disk space used on the floppy disk. If the floppy contains more data than the total size of the installed flash devices, the extra data will not be copied. The directory entries will still exist, but the data will not be found on the flash disk.

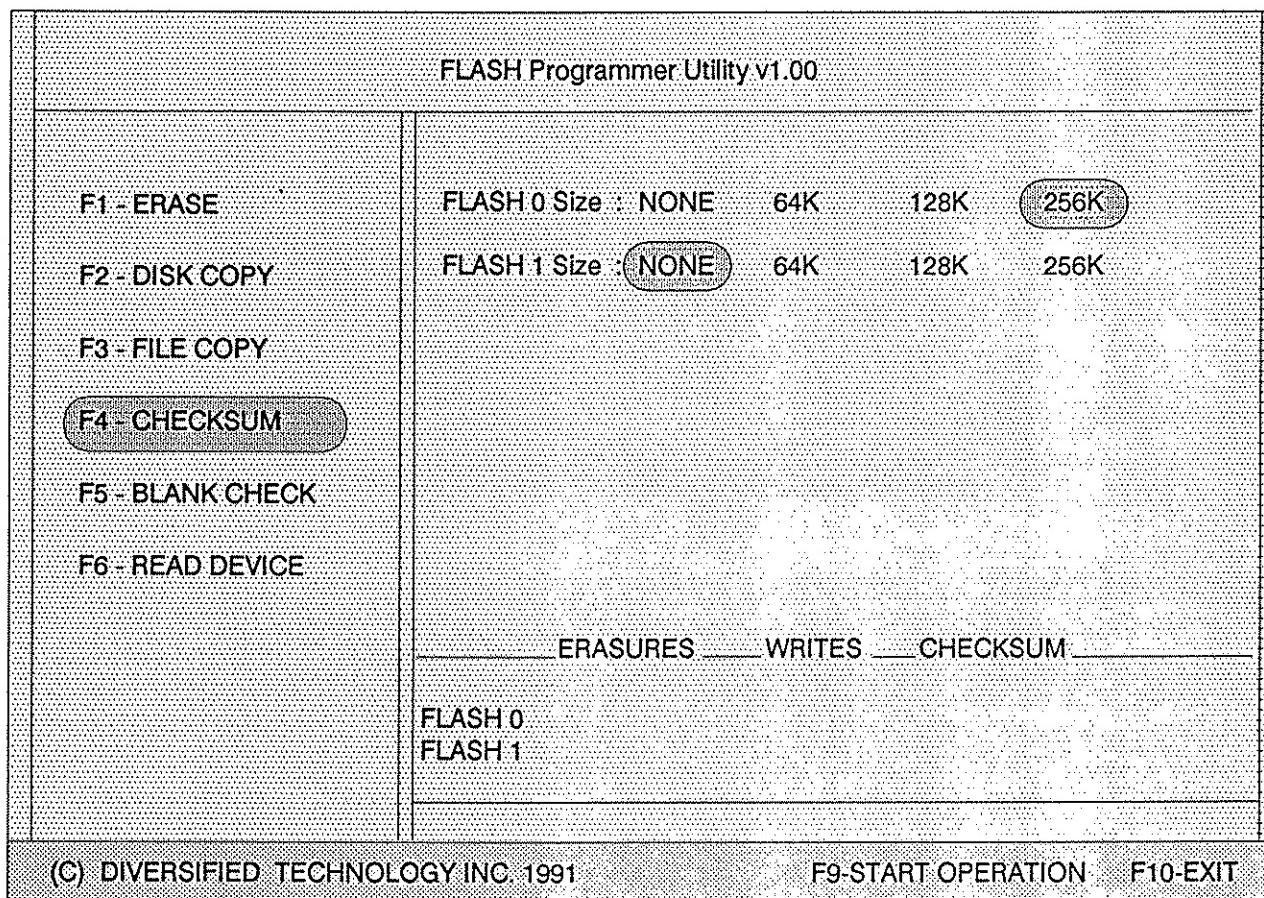


FILE COPY

The "FILE COPY" command is used to copy data from a disk file to a specified location within a flash device. The path and filename to read the data from and the starting address within the device must be specified before the command is started.

The start address specifies an offset from the beginning of the first installed flash device (00000h), and must be less than the user data size (the total size of the installed flash devices). For example, if two 64K flash devices were installed and the data were to be targeted for the beginning of the second device, the start address should be 10000h.

Note that this command copies data from a file into the flash device. It cannot be used to copy a file to a flash disk in the manner that the DOS "COPY" command copies a file from one disk to another.



CHECKSUM

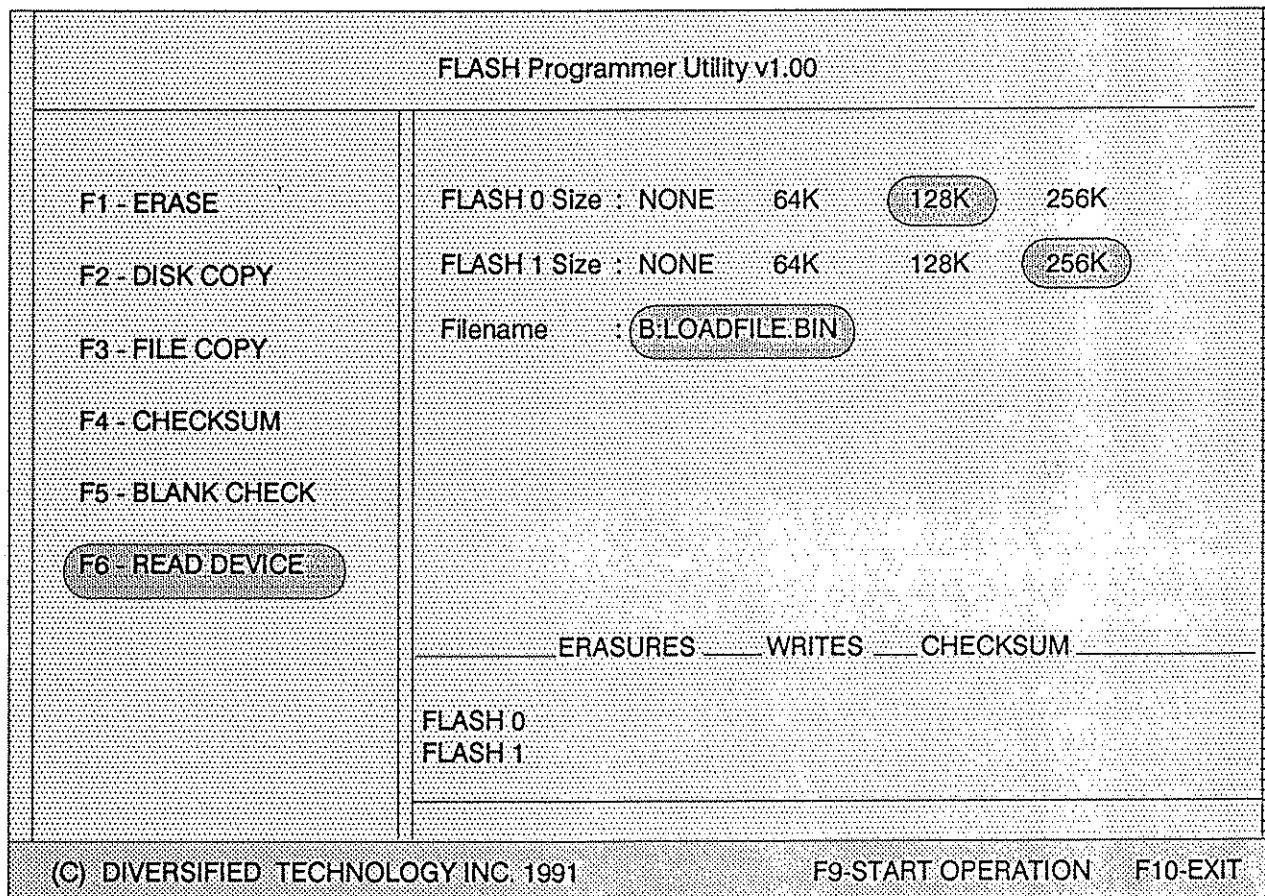
The "CHECKSUM" command generates a double word sum of all bytes in each flash device. This command does not alter the contents of any device. Upon completion of the command, the message "OPERATION COMPLETE" is displayed in the "MESSAGE" area, and the "FLASH STATUS" area is updated with the checksums of all enabled devices.

FLASH Programmer Utility v1.00					
F1 - ERASE	FLASH 0 Size : <input type="radio"/> NONE	<input type="radio"/> 64K	<input type="radio"/> 128K	<input checked="" type="radio"/> 256K	
F2 - DISK COPY	FLASH 1 Size : <input checked="" type="radio"/> NONE	<input type="radio"/> 64K	<input type="radio"/> 128K	<input type="radio"/> 256K	
F3 - FILE COPY					
F4 - CHECKSUM					
F5 - BLANK CHECK					
F6 - READ DEVICE	ERASURES ____ WRITES ____ CHECKSUM _____				
	FLASH 0				
	FLASH 1				
(C) DIVERSIFIED TECHNOLOGY INC. 1991			F9-START OPERATION		F10-EXIT

BLANK CHECK

The "BLANK CHECK" command verifies that the selected devices are completely erased. The "BLANK CHECK" command does not alter the contents of the device, but performs an "ERASE VERIFY" command on each byte of every enabled flash device.

A single device can be checked by selecting the size of all other devices to be "NONE". This procedure can be repeated to "BLANK CHECK" each device individually, or all devices can be checked by selecting the appropriate size for each device before the "BLANK CHECK" command is started.



READ DEVICE

The "READ DEVICE" command copies the contents of the installed flash devices into a disk file. The file name and path must be specified before the command is started.

The contents of all enabled devices are read into the file. A single device can be read by selecting the size of all other devices to be "NONE". This command can be used in conjunction with the "FILE COPY" command to copy the contents of one flash device into another.

3.2 PARAMETERS

The "PARAMETERS" section of the screen may vary based on the selected command. The FLASH Size parameters must be specified for every command. Other parameters will only be required for specific commands. Use the UP and DOWN arrow keys to select the different parameters, and the RIGHT and LEFT arrows keys to change the parameter value. The ENTER key must be pressed to enter the filename and the start address.

FLASH X Size

These parameters specify the type of device installed in each socket. The FLASH utility initializes these values based on the electronic identification code read from the devices (for Intel devices only). The device parameters can be changed, but should typically be set correctly for the installed device or to "NONE" to disable the device for inclusion in the selected command.

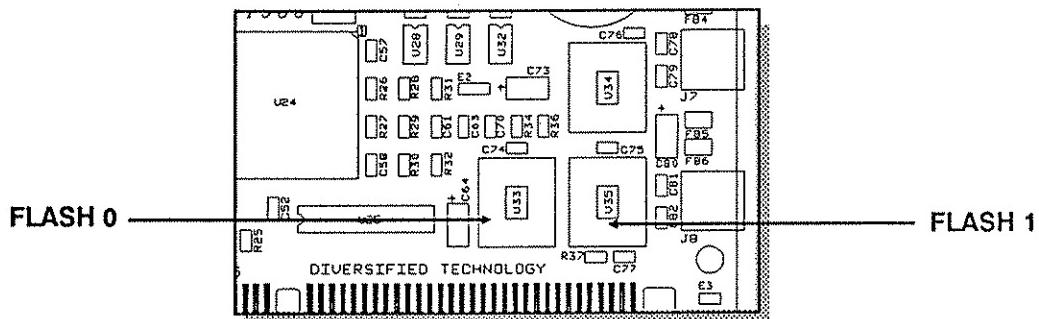
Drive to Read

This parameter specifies the source drive for the "DISK COPY" command. This should be the floppy drive containing the diskette to be copied to the flash disk.

Media Type

This specifies the media type of the source diskette for the "DISK COPY" command.

WARNING : The type of disk emulation configured in the ROM Utilities must be the same as the type of disk used to create the flash disk



Filename

This specifies the target filename, including the path, for the "READ DEVICE" command, or the source filename, including the path, for the "FILE COPY" command. The filename should specify the drive, path, and filename for the file. If no drive or path are specified, the default drive and path are assumed.

Start Address

This parameter specifies the hexadecimal offset address into the set of flash devices at which the "FILE COPY" command begins writing data. The starting address can be calculated by adding the total size of the devices preceding the target device to the offset within the target device. For example, assume that device 0 and 1 are 128K devices. To copy a file, offset 8000h in device 1, the start address would be 28000h (20000h + 8000h).

3.3 FLASH STATUS

The "FLASH STATUS" area displays information about each flash device. This information includes the checksum and critical data about the life cycle of the flash device. The checksum of the device is a simple double word sum of every byte in the device. This area also displays the maximum number of retries required to program and/or erase each flash device. Intel rates the typical life expectancy of a flash device around 10,000 erase/program cycles. The program algorithm limits the number of retries on write cycles to 25, and on erase cycles to 3000. As a device begins to approach its life expectancy, the number of iterations required to program or erase device begins to approach these maximums. Typically, a flash device will program without retries when it is new. Erasures normally require several iterations to completely erase the device.

3.4 MESSAGE AREA

The "MESSAGE AREA" displays information about the status of the command being executed, reports the physical flash and bank being read or written, and reports any errors that occur.

ERROR MESSAGES

"**ERROR : Not enough available memory"**

Indicates that the Flash Programmer was unable to allocate a 9k byte buffer from system memory.

"**ERROR : Unable to read floppy disk "**

The floppy diskette being read has a bad sector. Format a new floppy diskette, copy files onto the diskette and try again.

"**ERROR : Overflow"**

An attempt was made to read or write past the end of the last flash memory bank.

"**ERROR : Unable to write to Flash X"**

Indicates that the flash could not be written to. The flash device might be worn out. Before replacing the flash make sure the following has been done:

- 1) SW 1-1 "OFF" to enable the flash.
- 2) Jumper E2 on pins 2-3 for 12v.
- 3) Verify that the device is actually a flash.

Most flash devices are stamped with the word flash.

"**ERROR : Unable to Erase Flash X"**

Indicates that the flash could not be erased. The flash might be worn out. Before replacing the flash device make sure the following has been done:

- 1) SW 1-1 "OFF" to enable the flash.
- 2) Jumper E2 on pins 2-3 for 12v.
- 3) Verify that the device is actually a flash.

Most flash devices are stamped with the word flash.

"**DEVICE X NOT BLANK"**

Indicates that the device is not blank.

"ERROR : Invalid PATH or File name"

Indicates an invalid path or that the file could not be found.

"ERROR : Start address out of range"

Indicates that the start address entered exceeds the limits of the user data size. Enter a start address that is less than the user data size.

"ERROR: Directory is full"

The path specified has already met its limit of files. Either select a new directory, delete a file from the directory or increase the number of files available in a directory.

"DISK FULL"

Indicates that the drive specified in the filename path does not have enough available space for the file.

"DISK DRIVE UNACCESSIBLE"

Indicates that the drive to be written could not be read.

" ERROR : Invalid Size Selected for Flash X "

Indicates that the device size specified does not match the size of the device installed.

SECTION B4 USING THE FLASH TSR

4.0 GENERAL INFORMATION

FTSR is a memory resident utility which provides application programs with an interface to the flash devices via software interrupt 15h. It provides capabilities for erasing, reading or writing the flash devices, as well as returning device size information.

FTSR is a DOS compatible memory resident program. Once it is loaded it remains in memory until the system is rebooted. The utility links into software interrupt 15h. Application programs can access the FTSR by executing an INT 15h instruction with register AH set to 0FCh. The desired function is specified by a coded value in register AL.

FTSR will not install if there are no flash devices installed, the flash are disabled (SW1-1 "ON"), or if FTSR has already been loaded. In each of these cases a DOS ERRORLEVEL is returned. An ERRORLEVEL of 0 is returned if FTSR installs successfully.

The parameters required for accessing the flash device via the FTSR program are described below.

BLOCK NUMBER - This parameter specifies the 64K block within the installed flash in which the target data is located. Each flash device contains 1 (28F512), 2 (28F010), or 4 (28F020) blocks. The first block in the first flash device is designated block 0. The maximum value for this parameter is the total number of blocks in all of the installed flash devices minus one. For example, if two 28F020 devices are installed, this parameter may contain the value zero (00h) to seven (07h).

BYTE COUNT - This parameter specifies the length of the data (in bytes) minus one. Zero represents a data size of one byte, FFFFh represents the maximum data size of 64K bytes.

DATA POINTER - This parameter specifies the memory address of the data buffer. For the read function, this is the location where the data from the flash is to be stored. For the write function, this is the location from which the data is to be read.

BYTE OFFSET - This parameter specifies a starting location from the begining of the specified block. For the read function, this is the location in the flash to start reading from. For the write function, this is the location in the flash to start writing to.

ERROR CODES - The carry flag (CY) is used to signify that an error has occurred. If the CY flag is set to 1, the AX register specifies which error occurred.

0000h = Command completed without any errors.

FFFAh = Attempt to read or write beyond the end of a segment.

FFF Bh = Attempt to read or write past the last block.

FFF Ch = Attempt to erase a flash that is not installed.

FFF Dh = Attempt to read or write a non-existent bank.

FFF Eh = The number of erase or writes iterations exceeded maximum range.

FFF Fh = The erase function could not write 00h to all location.

4.1 THE READ FUNCTION

The read function copies data from the selected flash block into memory. The memory location to be written to must be in one segment. If an attempt is made to write beyond the end of segment (OFFSET + COUNT > FFFFh), FFFAh is returned. Reading past the end of the last block constitutes an error and FFFFh is returned. If the requested bank does not exist, the function returns FFFDh.

AH = FCh

AL = 01h

BX = BYTE OFFSET

CX = BYTE COUNT

DX = BLOCK NUMBER

ES:SI = DATA POINTER

Returns: CY = 0, AX = 0
 CY = 1, AX = ERROR CODE

4.2 THE WRITE FUNCTION

The write function writes one byte at a time to the flash and verifies that it was written correctly. If it was not written correctly, it is written and verified again. A counter keeps track of the number of write cycles needed to write a byte. The counter is reset after each byte. The function returns the maximum number of writes needed to successfully write a byte. This value should be monitored to prevent the flash from going bad and losing all of the data on the flash. If a byte is not written correctly after 25 attempts the function returns FFFEh indicating that the flash is not blank or is bad.

The data to be written must be contained within one memory segment. If an attempt is made to read beyond the end of segment (OFFSET + COUNT > FFFFh), FFFAh is returned. Trying to write past the end of the last block constitutes an error and FFFFh is returned. If the requested bank does not exist, the function returns FFFDh.

AH = FCh
AL = 02h
BX = BYTE OFFSET
CX = BYTE COUNT
DX = BLOCK NUMBER
ES:SI = DATA POINTER

Returns: CY = 0, AX = Maximum number of iterations needed to write data, or ERROR CODE.
CY = 1, AX = ERROR CODE

4.3 THE SIZE FUNCTION

The size is returned as the total number of 64k blocks available. This does not indicate the amount of blank (or empty) space available for writing.

AH = FCh
AL = 03h

Returns: AX = Total number of 64k blocks available in flash.

4.4 THE ERASE FUNCTION

The erase function erases an entire flash device, not just a particular block in a flash. The function writes zeroes to all locations, executes the flash erase command, then verifies that all locations are FFh. If a location is not FFh, the flash erase command is repeated and verification continues from the location that was not FFh. The function returns the number of times the flash erase command was executed. A large return value could indicate that a flash is near the end of its life.

If the function could not write 00h to a location, FFFFh will be returned. This indicates a bad flash device.

If the flash can not be verified as erased after the flash erase command has been given 3000 times, the function will return FFFEh. The flash is probably bad.

If the selected flash is not installed, FFFCh is returned.

AH = FCh

AL = 5Ah

DX = flash to erase (0 = flash 0, 1 = flash 1)

Returns: CY = 0, AX = Number of iterations needed to erase flash, or
ERROR CODE.
CY = 1, AX = ERROR CODE

CAT985 Hardware Compatibility List

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Hardware:

- Hard Disk
 - Conner, CP3044
 - Seagate, ST-125
 - Seagate, ST-125N
 - Seagate, ST-251
 - Conner, CP3040
- Floppy Drives
 - TEAC FD-55GFR 1.2Mb
 - TEAC FD-235HF 1.44Mb
 - Fujitsu M2553K 1.2Mb
 - Fujitsu M2551A 360K
- Memory
 - Intel Above Board
 - Everex Memory Board
- Arcnet
- Printer
- Video Display
 - NEC Multisync 3D
 - Microfield Graphics Adapter w/ Monitor

Hardware Continued:

- Video Adapters
 - Paradise VGA
 - ATI Wonder VGA
 - C&T 452 VGA
 - C&T 453 VGA
 - C&T 455 VGA
 - Renaissance VGA
 - Oak VGA
- Hard Drive Controller
 - Adaptec SCSI
 - Western Digital WD7000 SCSI
 - Western Digital WD1003
 - Future Domain SCSI
 - DTI CEX543 IDE, Future Domain SCSI
 - DTI CEX706 IDE, DTI SCSI
 - DTI CEX572 IDE, WD ST-506, DTI SCSI
 - Western Digital WDXT-GEN XT ST-506
- Mouse
 - Microsoft Serial - PS/2
 - Compatable Mouse

CAT985 Software Compatibility List

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Software:

- CAD Autodesk, AutoCAD R10
 - Data Communication Meridian Technologies, Carbon Copy Plus 5.1 Datastrom, Procomm 1.1B
 - Desktop Publishing Xerox, Ventura Publisher 3.0 Aldus, Pagemaker 4.0
 - Graphics Microsoft, Paintbrush 3.0 ZSoft, Publishers Paintbrush 2.0
 - Integrated Quarterdeck, Desqview 386 2.2 Quarterdeck, QEMM 386 5.0 Microsoft, Windows 3.0a Digital Research, Gem 3.0
 - Network Novell, Netware 2.15 Future Domain Driver 2.01
 - Utilities Microsoft, DOSSHELL 4.01 Microsoft, DOSSHELL 5.0 Microsoft, VDISK 3.3
- Software Continued:
- Operating System MSDOS 3.3 MSDOS 4.01 MSDOS 5.0 OS/2 1.2 Future Domain Driver 1.11 Interactive Unix 2.2.1 Future Domain Driver Built In SCO Xenix 2.3 Future Domain Driver 5.0
 - Word Processing Microsoft, Write 3.0
 - Math PC Labs, HLFloat
 - Benchmarks Coretest, Coretest 2.92 Norton, SI 4.5 Landmark, Speed 1.14 C&T, MIPS 1.20 TouchStone, Checkit 2.1 Power Meter 1.2

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